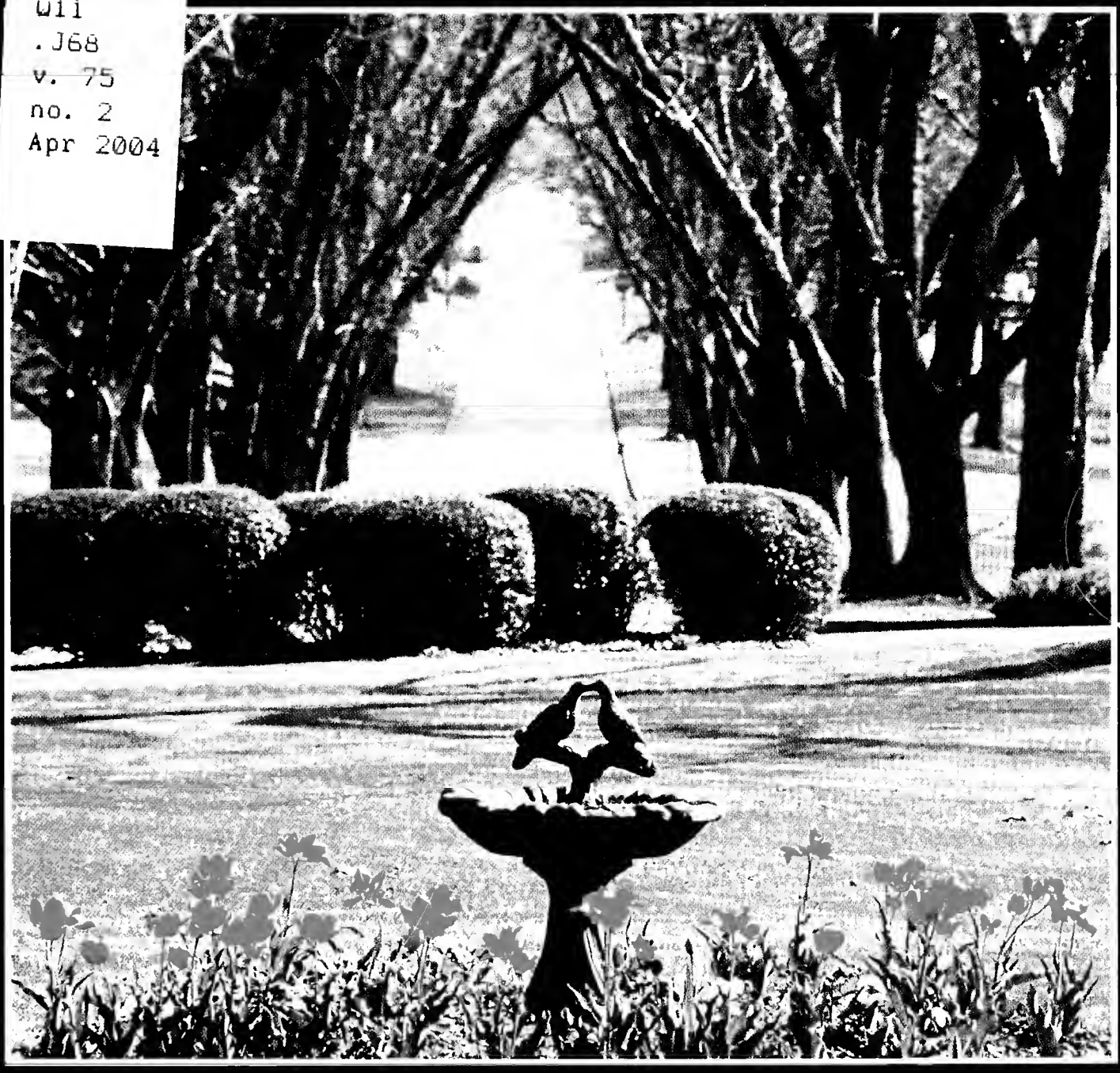
THE JOURNAL OF THE ALABAMA ACADEMY OF SCIENCE



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Cover photograph: Flower Hill's stately drive, a favored walk of students and visitors in the spring, is canopied by a long line of pecan trees extending from the bird bath fronting the president's home at Flower Hill all the way to the primary freshman residence building, Main Hall.

Photo Credit: Matthew Orton, Director of Photography at the University of Montevallo, site for the 81st annual meeting of the Alabama Academy of Sciences, March 17-20, 2004.

Errata

This issue is Volume 75, no. 2, April 2004.

It was incorrected marked on cover and masthead.

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ABSTRACTS

Papers presented at the 81st Annual Meeting
University of Montevallo
Montevallo, AL 35115
March 17-20, 2004

BIOLOGICAL SCIENCES

VERTEBRATE ROAD-KILL SURVEY OF THE MOBILE-BAY CAUSEWAY III.

David H. Nelson, Department of Biology, University of South Alabama, Mobile, AL 36688. Cynthia Scardamalia-Nelson, Counselor, Providence Hospital, Mobile, AL 36608.

A systematic survey was conducted weekly during 2003 by bicycle (or automobile) on the Mobile Bay Causeway to assess the numbers of vertebrates killed by vehicular traffic. More than 933 organisms were encountered, representing 102 species of vertebrates: 5 amphibians (n=166), 26 reptiles (n=309), 55 birds (n=339), and 16 mammals (n=119). Southern leopard frogs (*Rana utricularia*) were the most abundant amphibian observed (March to December) representing 73% of all amphibians. "Endangered" Alabama red-bellied turtles (*Pseudemys alabamensis*, n=99) were the most common reptile, accounting for 32% of all reptiles; most of these (67) were hatchlings. Laughing gulls (*Larus atricilla*, n=54) and Starlings (*Sturnus vulgaris*, n=52) were the most frequently encountered birds (representing 16% and 15% of birds, respectively). Raccoons (*Procyon lotor*, n=42) and Opossums (*Didelphis marsupialis*, n=36) accounted for 35% and 30% of all mammals, respectively. The most significant finding of this continuing study is the confirmation of 67 hatchlings (March-May, November), 29 adult females (most gravid; May-August), and 3 juveniles (Sept-Oct) of the Alabama red-bellied turtle. Most hatchlings overwintered in the nest to emerge in the early spring. For the last three years, the impact of vehicular mortality on this endangered species has been profound. We also documented the presence of the Florida green water snake (*Nerodia floridana*) in Baldwin County, Alabama.

Detection of Total and Pathogenic *Vibrio vulnificus* using Multiplex PCR and DNA Microarrays.

Gitika Panicker and Asim K. Bej, University of Alabama at Birmingham, AL-35294.

V. vulnificus, a naturally occurring estuarine microorganism, is often found in high numbers in shellfish harvested from the Gulf of Mexico during the summer months. It can cause gastroenteritis or lead to septicemia and death in susceptible individuals when consumed in the form of contaminated raw oysters. Results from PCR amplification using oligonucleotide primers for regions of 16S rDNA and *viuB* to identify clinical isolates of *V. vulnificus* showed that 83.3% of environmental isolates had "type A" rDNA whereas 61% of the clinical isolates were "type B". On the other hand, PCR amplification of *viuB* followed by gene-probe hybridization exhibited positive results for 100% of clinical isolates and 22.6 % of environmental isolates. Thus, implying that *viuB* is a better target for the identification of clinical strains. Next, biotin-labeled multiplexed PCR-amplified *viuB* and *vvh* gene segments were subjected to microarray hybridization at 50°C to detect total and clinical strains. Positive hybridizations were detected using Tyramide Signal Amplification™ with Alexa Fluor® 546. Other shellfish-borne pathogens, *V. parahemolyticus* and *V. cholerae*, were also detected using the DNA microarray with their respective gene probes. Results exhibit that a combination of multiplex PCR and microarray hybridization permits a specific and sensitive system for detection of microbial pathogens in shellfish.

URBANIZATION FACTORS THAT AFFECT AQUATIC BIOLOGICAL COMMUNITIES.

Janna Owens, Robert Angus, Melinda Lalor, Jaideep Honovar and Ken Marion, University of Alabama at Birmingham, Bham, AL. 35294. Steve McKinney, Storm Water Management Authority, Inc., Bham, Al. 35209.

Urban growth and development in the Jefferson County (Alabama) area are increasing at a steady rate. Factors accompanying urban growth that affect the quality of receiving waters include loss of vegetation, land disturbances, riparian alterations and an increase in impervious surfaces. Impacts related to these changes in water integrity are usually episodic in nature and therefore difficult to profile for water quality evaluations. Our objective was to examine possible correlations between a watershed's urbanization status and the community structures of fish and benthic macroinvertebrates in the upper Cahaba River basin in Birmingham, Alabama. A series of metrics were utilized to evaluate the status of the aquatic communities and to determine possible trends linked to urbanization factors by comparing metrics with water chemistry, habitat conditions, accumulated sediment depths and upstream land usage characteristics. To calculate upstream urbanization characteristics, geographic information systems (GIS) and selected data layers were used to construct a cartographic model. Significant correlations were found between the percentage of impervious surfaces in the upstream watershed and pollution-sensitive macroinvertebrate metrics, such as the EPT and Hilsenhoff Biotic indices. Darters, suckers and selected minnow species correlated negatively with the percentage of impervious surfaces, habitat scores and sedimentation values, respectively. Management strategies for aquatic systems that link water quality monitoring and geographic information with aquatic community data will be able to characterize, detect and remediate the effects of urbanization more precisely.

CONSERVATION GENETICS OF MONTANA SAUGER.

Rachael N. Koigi and Neil Billington, Dept. of Biol. Environ. Sciences, Troy State Uni., Troy, AL 36082. William Gardner, Montana Dept. of Fish, Wildlife and Parks, Lewistown, MT 59457.

There is growing concern regarding the decline of sauger (*Sander canadensis*) populations in Montana. Decline has been greatly attributed to habitat loss, effects of diversion dams, and hybridization with walleye (*S. vitreus).* No information existed on genetic variation in Montana sauger prior to this study, but 0-15 % hybridization has been reported in several previous studies. Protein electrophoresis was used to examine genetic variation in sauger populations and to screen for hybridization between native sauger and introduced walleye. Genetic variation was detected at two (*SOD** and *PGM-1**) of 25 protein-coding loci screened, excluding the four loci diagnostic between the two species. Although only one heterozygote was found at *PGM-1**, significant differences in allele frequencies were found at *SOD** in both Missouri River and Yellowstone River sauger populations. This is the first time polymorphism has been reported at the *SOD** locus in sauger. Due to the significant genetic variation present in sauger populations in each of the two main river systems, they will need to be managed separately and no stock transfer should be conducted. Hybridization rates compared to those of previous studies (0-20%), being highest in the Missouri river drainage. Hybridization with walleye poses a serious threat to the genetic integrity of the Montana sauger; therefore, brood stock used for supplemental programs should be genetically screened to prevent the unintentional spawning of hybrids.

HYBRIDIZATION AND INTROGRESSION BETWEEN WALLEYE AND SAUGER FROM POOL 13 OF THE MISSISSIPPI RIVER.

Jennifer Lynch, and Neil Billington, Dept. Biol. Environ. Sciences, Troy State Univ., Troy, AL 36082, and John Pitlo, Iowa DNR, Bellevue, Iowa 52031.

Iowa Department of Natural Resources (DNR) personnel have observed fish in Pool 13 of the Mississippi River with intermediate morphological characteristics between walleye (*Sander vitreus*) and sauger (*S. canadensis*) suggesting they were hybrids. Hybridization and introgression between walleye and sauger has been demonstrated in several studies, which also documented difficulties in determining hybridization rates by morphology compared to protein electrophoresis. Walleye and sauger show fixed allelic differences at four protein coding loci: *ALAT** and *IDDH** from liver and *mMDH-1** and *PGM-1** from muscle. Forty-four *Sander* specimens were collected by electrofishing from Pool 13 on October 22, 2003, 21 (45%) of which were identified by morphology as walleye, 20 (45%) as sauger, and three (7%) as suspected hybrids. Protein electrophoresis of the four diagnostic loci revealed that 17 (39%) were walleye, 16 (36%) were sauger, and 11 (25%) were hybrids. The three fish initially identified as hybrids were confirmed by electrophoresis (two backcrosses to walleye and one F_1 hybrid). Four fish identified as walleye by morphology contained sauger alleles (two backcrosses to walleye, one backcross to sauger, and one F_x hybrid). Four fish identified as sauger by morphology contained walleye alleles (all were backcrosses to sauger by electrophoresis). Overall, 8/44 (18%) fish were misidentified by morphology. The use of protein electrophoresis for identification of *Sander* specimens is strongly recommended, particularly if hybridization is suspected.

TEMPERATURE DEPENDENT VITELLOGENESIS IN MALE *GAMBUSIA AFFINIS*.

Paul D. Melvin, III, R. Douglas Watson, and Robert Angus
Department of Biology, Univ. of Ala. at Birmingham, Birmingham, AL 35294

Many anthropogenic compounds with estrogenic activity have been detected in aquatic environments. Vitellogenin (VTG), an egg yolk protein produced by the liver in oviparous female vertebrates in response to estrogen, is not normally detectable in the serum of males. Various studies have indicated that environmental estrogens can induce vitellogenesis in males of a variety of aquatic vertebrate species, including the western mosquitofish, *Gambusia affinis*. If VTG presence in male serum is to serve as a reliable estrogen biomarker, it is important to understand other factors that influence its production. Although the regulation of vitellogenesis is poorly understood, previous observations in our lab have suggested that temperature plays an important role. We hypothesize that estrogenic induction of vitellogenin in males will decrease as water temperature decreases.

In this study, male *G. affinis* were exposed to 17α-ethynyl estradiol via diet at a concentration of (10 ug/g of food) for a period of one week. This concentration was previously shown to strongly induce VTG production in one week at 24° C. During exposure, the fish were kept at a constant water temperature of 16°, 20°, or 24° (± 1°) C. - The animals were then bled by heart puncture. The blood was analyzed by native gel electrophoresis and western blot for the presence of vitellogenin protein in blood serum. Vitellogenin production in male *G. affinis* was positively associated with environmental temperature. These preliminary results demonstrate that temperature strongly affects the extent to which *Gambusia affinis* produce VTG in response to estrogen exposure.

CANNABINOID VARIATIONS DURING THE GROWING SEASON OF A TURKISH VARIANT OF CANNABIS SATIVA, L.,

Norman J. Doorenbos, Department of Pharmacal Sciences, Harrison School of Pharmacy, Auburn University, Auburn, AL 36849, R. Oswaldo Guerrero, School of Pharmacy, University of Puerto Rico, San Juan, PR 00936-5067 and Maynard W. Quimby, College of Pharmacy, University of Mississippi, deceased.

Over twenty varieties of *Cannabis sativa* L. were included in our marihuana research program at the University of Mississippi. We discovered considerable variation in cannabinoid content of marihuana samples. Factors affecting cannabinoid content included heredity, plant parts in the sample, age of plants when harvested.and environmental factors. Δ9-tetrahydrocannabinol (THC) content was highly variable among these varieties. Those with higher THC values were identified as "drug types." They often were associated with drug use. Those with low THC content were identified as "fiber types." They often were associated with plants grown for fiber (hemp).

Although most of our studies focused on drug types, fiber types remained of interest as potential agricultural crops. There was a need to determine how much the cannabinoid content varied during the growing season in a fiber type. A Turkish fiber variety was selected . The results of this study will be shared. Comparisons of drug and fiber types also will be made in this illustrated presentation.

NESTING ACTIVITY IN THE ALABAMA RED-BELLIED TURTLE (*PSEUDEMYS ALABAMENSIS*).

Gabriel J. Langford, David H. Nelson, and Joel A. Borden, Dept. of Biology, Univ. of S. Ala., Mobile, AL 36608.

A study of nesting activity in the Alabama red-bellied turtle was conducted in the vicinity of the Mobile Bay causeway (Baldwin Co.) during the summer of 2003. Females were observed as they deposited eggs in the field. Nests were labeled and protected by predator-exclusion covers to conserve eggs until they could successfully complete development. Nests were laid along terrestrial elevations from June 15 to August 5, 2003. Clutch sizes for 20 nests ranged from 7 to 19 eggs (mean = 12.0). Developmental periods (from oviposition to emergence) for nests ranged from 67 to 123 days (mean = 99.2). The numbers of hatchling emerging from each of the nests ranged from 2 to 14 (mean =8.4). The numbers of undeveloped eggs ranged from 0 to 17 eggs per nest (mean =3.5). Virtually all hatchlings manifested maxillary cusps, eyebars, and reddish plastrons (with vermiculations). Measurements of 177 hatchlings (from 21 clutches) disclosed a mean carapace (straight line) length of 3.7cm, a mean carapace width of 3.6cm, a mean plastron length of 3.4cm, a mean tail length of 0.97 cm, and a mean wet body weight of 11.9 grams. Predation of uncovered nests by fish crows, raccoons, and ants was very high. At one site on the Blakely River, the ratio of depredated to covered nests was 13:1. A total of 159 protected hatchlings were released into the environment.

USE OF ANAEROBIC BACTERIA AS PROBIOTICS IN AQUACULTURE.

Mark Meade and Benjie Blair. Jacksonville State University, Dept. of Biology, Jacksonville AL 36265.

Probiotics have rarely been used in aquaculture. In this study, we examined the effects of an anaerobic bacterium as a potential probiotic in the culture of tilapia fry. Nile tilapia fry (0.20-0.25 g) we held in three 260*l* fiberglass tanks with associated re-circulating biofilters (n=200 fish/tank). All fish were fed a high protein commercial fish ration that contained a minimum of 50% crude protein (Aquamax® Starter Fingerling 300, PMI Nutrition International, Inc.). Feed proffered to two of the tanks was initially supplemented with anaerobic bacteria. Specifically, 25ml of *E. cellulosolvens* cells in exponential growth phase were collected by centrifugation and mixed with the feed. On subsequent feedings, all fish were fed solely the high protein fish ration not containing bacteria. Survival of tilapia in each tank was >95%. Final mean wet weights, however, were significantly different between the two treated tanks compared to the control tank. Specifically, fish supplemented with the bacteria had final mean wet weights of 0.99g ± 0.6 (s.e.) and 0.83g ± .05 (s.e.), whereas the control fish had final mean wet weights of 0.62g ± 0.3 (s.e.). An analysis of size distribution frequencies demonstrated that between 40 and 50% of bacteria supplemented fish were 1g or larger in size, whereas < 20% of the control fish had attained a size of 1g. These data suggest that anaerobic bacteria may be a beneficial probiotic in the culture of tilapia and may serve to accelerate growth rates.

FLORIDA MANATEE FINGER BONES UNDER THE FINGERNAILS. Gerald T. Regan, Chief Scientist, Marterra Foundation Inc. 4000 Dauphin Street Mobile, AL 36608.

The nails of specimen SHCM350 had the second, third, and fourth finger bones underlying them. The finger bones are counted as though the homolog of the thumb is the first. This observation is reported here because the most recent reviews of the subject of the nails of manatees appear to be silent on the finger bone issue. There have been reports of Florida manatees with four nails, and this report can make it easier to describe which of the remaining finger bones underlies a fourth nail when present. The opportunity to make the observation occurred when a male Florida manatee, *Trichechus manatus latirostris*, 260 cm long, stranded dead on the south side of Dog River in Mobile County on February 25, 2002. The cause of death was probably cold stress. After the necropsy I froze the flippers, in which homologs of nearly all of the bones of a mammalian forearm are located. Each had three nails on its dorsal surface. On June 14, I took the frozen right flipper to the office of a chiropractor to have X-ray photographs made after positioning X-ray opaque hex nuts on each nail. Once the X-ray film was developed, there was no doubt about the conclusions. I acknowledge the help of Cheryl A. King, the funding of the transportation of the manatee by the USFWS, and the donated expert X-ray service of Jeff Townley and his staff.

EVALUATION OF DEVELOPMENTAL TOXICITY OF INTERACTION BETWEEN CAFFEINE AND PSEUDOEPHEDRINE USING FROG EMBRYO TERATOGENESIS ASSAY-XENOPUS (FETAX). Bernice L. Moser, Angéllete Daegle, and James R. Rayburn, Dept. of Biology, Jacksonville State University, Jacksonville, AL, 36265-1602.

Pseudoephedrine and caffeine are found in many over-the-counter drugs including decongestants and weight loss chemicals. Both are proven central nervous system stimulants, and there has been much discussion about potential interactions of these chemicals on human health. Frog Embryo Teratogenesis Assay-Xenopus (FETAX) was used to determine the developmental toxicity of pseudoephedrine and caffeine mixtures and to determine if synergism or antagonism occurs between the two. FETAX is a 96-hour developmental toxicity assay that screens for direct acting teratogens. Both have both been evaluated for developmental toxicity in FETAX but not as mixtures. Potentiating effects of caffeine on the cardiovascular teratogenicity of ephedrine in chick embryos has been shown. Due to the similarities between pseudoephedrine and ephedrine we wanted to determine if synergism occurred between pseudoephedrine and caffeine. The 96-hr LC50, 96-hr EC50, MCIG, and TI were determined for pseudoephedrine and caffeine in various mixtures. We tested five binary mixtures of the two chemicals. The mixtures were based on the toxic units of each chemical; where one toxic unit was equal to the 96-hr LC50. The toxic unit mixtures tested was pseudoephedrine to caffeine at toxic unit ratios of 0:1, 1:0, 3:1, 1:1, and 1:3. The 0:1 and 1:0 test the individual chemicals by themselves. Toxic units were plotted on an isobole graph to determine if synergism, concentration response or antagonism occurred

AQUATIC HERPETOLOGICAL INVENTORY OF THE UPPER MOBILE-TENSAW DELTA

Joel A. Borden, David H. Nelson, Gabriel J. Langford, Dept. of Biology, Univ. of South Ala., Mobile, AL 36688.

A herpetological field survey was conducted during the summer of 2003 on the Upper Delta Wildlife Management Area in Mobile and Baldwin Counties, Alabama. Sampling techniques included minnow traps, dipnets, hand captures, visual surveys, cryptozoan (cover) boards, anuran vocalization, and PVC tubing (for tree frogs). A total of 14 species of amphibians were encountered (N=1441): 3 salamanders (all aquatic) and 11 anurans. Most frequently encountered were bronze frogs, bullfrogs, bird-voiced tree frogs, and gray tree frogs. Minnow traps were the most effective sampling technique for amphibians. No terrestrial salamanders were ever recorded (even under cover boards). A total of 24 species of reptiles were encountered (N=372): 7 turtles, 1 crocodilian, 4 lizards, and 12 snakes. Most frequently recorded were black-knobbed sawback turtles, American alligators, ground skinks, five-lined skinks, ribbon snakes, cottonmouths, and banded water snakes. Visual observations proved to be the most productive technique for reptiles. Five glossy crawfish snakes and 3 mud snakes were captured by hand or in minnow traps.

THE EFFECT OF URBANIZATION ON THE DIVERSITY OF FISH ASSEMBLAGES AND THE BIOLOGICAL INTEGRITY OF IMPACTED STREAMS IN THE SOUTHEASTERN PLAINS ECOREGION, ALABAMA.

Bonnie Hamiter, Kristy Pisani, Christa Collins, Megan Pilarczyk, and Jonathon Miller, Department of Biological and Environmental Sciences, Troy State University, Troy, AL 36081.

One of the leading causes of stream impairment in the United States is urbanization. By assessing biological communities, previous studies have shown the negative impact of urbanization on biological integrity. Urbanization affects the presence of intolerant and tolerant species, species diversity, and the occurrence of deformities, erosions, lesions, and tumors (DELTs) Eighteen urban-impacted and three least-impacted streams in the Choctawhatchee and Pea Rivers watershed were sampled for fish assemblages using a backpack electroshocker. Of the 3,654 fish collected from the 21 sample sites, 38 species were identified. Shannon-Wiener diversity index results did not indicate lower species diversity at urban-impacted sites than least-impacted sites. Data analysis also included application of an Index of Biotic Integrity (IBI) previously established for the Choctawhatchee and Pea Rivers watershed. The IBI did not show reduced scores at urban sites. However, certain metrics within the IBI revealed an impact on the fish assemblages in urban sites. Examination of DELT anomalies suggested a greater abundance of lesions and erosions at urban than least impacted sites. Results suggest that the IBI established for the study area may only adequately assess the stream biological integrity for the stream conditions under which it was established.

FUNGAL METABOLISM STUDIES OF DEHYDRO-ABIETIC ACID, Norman J. Doorenbos, Department of Pharmacal Sciences, Harrison School of Pharmacy, Auburn University, Auburn, AL 36849, James Flor, Merck Sharp and Dohme Laboratories, Rahway, NJ, deceased, Larry Robertson, College of Pharmacy, Ohio State University, Columbus, OH 43210.

Dehydroabietic acid, readily available from natural sources. is a potential starting material for the synthesis of C-arylsteroids.and other substances of potential medicinal value. Its utility would be enhanced by the presence of additional functional groups. This research was undertaken to find fungi to introduce hydroxyl groups.

We wish to report the discovery that submerged cultures of *Aspergillus flavipes and Whetzelinia sclerotiorium* may be used to prepare 7β-hydroxydehydroabietic acid, 7β,15-dihydroxydehydroabietic acid and 3β,7β,15-trihydroxydehydroabietic acid and derivatives. These cultures were selected after screening twenty species of fungi in the first phase of this study. Chemical structures of the metabolites were established by physical and chemical methods including n.m.r., m.s., i.r. and elemental analyses.

FISHING FOR MERCURY AT THE LOCAL GROCERY. Dustin W. Morin, Karla E. Hinds, and Alfred C. Nichols, Dept.of Physical and Earth Sciences, Jacksonville State University, Jacksonville AL 36265.

Fish consumption is considered the single largest source of mercury (Hg) exposure to humans. Methyl mercury, the form of the metal most commonly found in fish, is both a human teratogen and central nervous system toxicant. We have tested samples of canned, frozen, and fresh fish purchased from local grocery stores for Hg concentrations. Samples were analyzed according to the USEPA Manual Cold Vapor Technique. Except for one sample of fresh catfish fillet, Hg was detected in all fish samples tested. Mercury levels in canned fish ranged from 0.01 to 0.51 ug/g (dry wt.). Highest concentrations of the metal were found in frozen swordfish steak (0.97 ug/g dry wt.) and frozen shark steak (0.76 ug/g dry wt.). While below the FDA limit, such levels may be of concern to young children and women in their reproductive years. Also included in the survey was a sample of canned chicken (no Hg detected) and a fillet from a channel catfish caught in a local farm pond (Hg level of 0.09 ug/g dry wt.).

A REVIEW OF THE CHEMICAL ECOLOGY OF ANTARCTIC MARINE SPONGES.

James B. McClintock and Charles D. Amsler, Dept. of Biology, Univ. of Ala. at Birmingham, AL 35294. Bill J. Baker, Dept of Chemistry, Univ. of South Fla., Tampa, FL 33620. Robert Van Soest, Univ. of the Netherlands.

The continental shelf waters of Antarctica are dominated by rich sponge communities. High in terms of both species diversity (417 species identified to date) and in biomass, these communities contribute considerable structural heterogeneity and surface area for epibiotic organisms. They also provide a significant food resource to predators, especially sea stars, whose selective feeding has important effects on community structure. Brief seasonal periods of mesoplankton availability are paradoxical considering the filter feeding habits of sponges. Food resources may be supplemented by uptake of DOM, and capture of smaller nanoplankton and picoplankton. In contrast to earlier theories that due to the lack of fish predation high latitude sponges should be depauperate in defensive metabolites, chemical defenses in Antarctic sponges are not uncommon. A variety of secondary metabolites have deterrent effects against spongivorous sea stars, and may be optimally sequestered in the outermost layers of sponges to deter their extra-oral feeding. Sponge metabolites have also been found that short circuit molting in sponge-feeding amphipods and prevent fouling by benthic diatoms. Coloration is a select group of Antarctic sponges may be the result of relict pigments originally selected for temperate or tropical conditions as aposomatics or UV screens that have been conserved because they themselves have defensive properties. Supported by NSF OPP-9814539 and OPP-0125181 to J.B.M and C.D.A. and OPP-990176 and OPP-0125152 to B.J.B.

THE EFFECTS OF INVASIVE PLANT SPECIES ON THE ECOSYSTEM OF SHADES CREEK.

Jeremy White, Reed Hogan, L. J. Davenport, Department of Biology, Samford University, Birmingham, AL 35229.

Invasive species have had a dramatic effect on the ecosystem surrounding Shades Creek. This 55-mile long waterway starts in Irondale, Alabama and ends in northern Bibb County as it flows into the Cahaba River. Four sites were chosen for this study, each varying in the level of human development present. Each site was studied using transect sampling with a 25-meter transect on both the north and south bank. All species were catalogued that lay within a 12-inch distance to either side at each meter mark. A total of 64 species were catalogued: 50 native species and 14 non-native species. Of the non-natives, three were deemed to be highly invasive--Kudzu, Chinese Privet, and Mimosa. This study found a direct correlation between the increase in human development and the increase in the presence of invasive species. (The types of human development included commercial and residential buildings, roadways, utility lines, and recreational structures such as trails.) As human development increases, there is an increase in the percentage of invasive species, a decrease in biodiversity, and a decrease in the presence of the native flora that is indigenous to that particular area.

ANALYSIS OF PCB CONTAMINATION IN LARGE MOUTH BASS AND CHANNEL CATS OF LOGAN MARTIN LAKE. Shawn Bailey and James R. Rayburn, Jacksonville State University, Jacksonville, AL 36265-1602, USA

This project will screen the fresh water species of Logan Martin Lake for possible PCB contamination with a qualitative analysis. The target species will consist of one bottom feeder, the channel cat (Ictalurus punctatus), and one predator, the large mouth bass (Micropterus salmoides). Composite samples will be taken of both species for data correlation between other testing groups and to increase the integrity of the results. These meet with the parameters set forth by the EPA Fish Contaminant Workgroup and the Alabama Department of Environmental Management (ADEM) and are representative of habitual consumptive habits for the local recreational anglers. If initial tests are positive, the samples will be retested with a quantitative analysis and weighed against the EPA's screening values and the FDA's action levels to ascertain the degree of risk associated with fish consumption in the areas tested. This is the first step in assessing a contamination risk to the recreational consumer, one that would support the fish advisories and tests already issued by the Alabama Department of Public Health (ADPH), EPA, and ADEM. This is also the first step towards a bioremediation project.

ORIGINS OF LOGGERHEAD SEA TURTLES IN ALABAMA: mtDNA ANALYSIS. Alyssa Geis, Thane Wibbels, Dept. of Biology, Univ. of Ala. at Birmingham, Birmingham, AL 35294. Dawn Fletcher, William Gates, and Randy Swilling, Bon Secour National Wildlife Refuge, Gulf Shores, AL 36542.

The loggerhead sea turtle (*Caretta caretta*) is a protected species inhabiting the Gulf and Atlantic coastal waters of the United States. Previous studies have identified several distinct genetic groups of loggerheads in these waters. The current project evaluated the origins of juvenile loggerhead sea turtles inhabiting the coastal waters of Alabama and hatchling loggerheads from nests monitored at the Bon Secour National Wildlife Refuge (BSNWR). To determine the genetic stock of these turtles, mitochondrial DNA control region sequences were sequenced and analyzed from juvenile and hatchling turtles. Blood samples were obtained from juvenile loggerheads that were captured by tangle net in the Alabama bay systems. Tissue samples were obtained from hatchlings that were found dead in nests at BSNWR after all the live hatchlings had emerged. Preliminary analysis of the data suggests that these turtles (both juvenile and hatchling) represent haplotypes common to the current management units referred to as the South Florida nesting subpopulation (occurring from northeast Florida to Sarasota on the west coast of Florida) and the Florida Panhandle nesting subpopulation (occurring at Eglin Air Force Base and the beaches near Panama City, Florida). The results of this study have significant management implications for loggerhead sea turtles in the northern Gulf of Mexico.

AN UPDATE ON FUNGAL INFECTIONS ASSOCIATED WITH AMBROSIA BEETLE INFESTATIONS.

Roland R. Dute, Brian L. Prather and Matthew J. Valente Dept. of Biological Sciences. Kathy S. McLean, Dept. of Entomology and Plant Pathology, Auburn University, Auburn AL 36849

The Asian ambrosia beetle (*Xylosandrus crassiusculus*) carries the fungus *Ambrosiella xylebori* with which the insect infects the wood of its host. The fungus, as it grows, serves as a food source for the beetles. In the spring of 2003, we were unable to isolate *A. xylebori* from either infected wood showing wilt or from beetles trapped in flight. There is controversy as to whether the activities of *A. xylebori* or a secondary fungus, also introduced by the beetle, are responsible for foliage wilt of trees. We decided to take a common fungal isolate from infested trees, *Fusarium oxysporum*, and attempt re-infection of a host (*Cercis canadensis*, redbud). Eight, saplings were used: two untreated controls, two receiving drill holes without inoculum, and four receiving drill holes with inoculum. After seven weeks the saplings were felled and 2 cm thick wood disks were cut at 2 cm above each drill hole. One-half of each disk was processed for fungal growth and culturing, and the other half was preserved and later sectioned with a sliding microtome. Although the saplings were asymptomatic at the time of collection, culturing showed the presence of *F. oxysporum* only in inoculated wood disks. This observation was confirmed using light microscopy on sectioned material. The presence of hyphae was distinct from the induction of brown discoloration and plugging of the water-conducting cells induced by the act of wounding the trees.

INFLORESCENCE ANATOMY OF *COMMELINA ERECTA* L.

Roland R. Dute, Department of Biological Sciences, Auburn University, Auburn, AL 36849. Floyd Woods, Department of Horticulture, Auburn University.

It is thought that various floral parts represent modified leaves. In *Commelina erecta* each flower contains both petals and sepals of two different sizes, and each inflorescence (flower cluster) is enclosed by a leaflike spathe. The anatomy of these laminar organs was compared with that of the vegetative leaves. Venation is closed in leaves, spathes, and small sepal; partly open in the large sepal; and open in the large petals. Vein terminations in large petals and (to a lesser extent) in large sepals consist of bundle sheath cells that extend beyond xylem and phloem. In petals, these vein prolongations exist as branched, digit-like structures. Callose staining indicates numerous cytoplasmic connections between bundle sheath cell prolongations and neighboring non-vascular cells. It is thought that the prolongations represent an auxiliary transport system shunting food and water to very thin portions of the petal. Elongate, multicellular raphide sacs form parallel rows in all organs investigated. Stomata, associated with gas exchange, are also located on all organs investigated. On leaves, spathes, and sepals, stomata consist not only of guard cells, but also of subsidiary cells. Petals however, have stomata with only guard cells. Elongate sacs containing granular or amorphous ergastic material exist in petals and sepals. Histochemical staining shows this material to be tannin. It is hypothesized that these sacs serve as deterrents to herbivory. In summary, the different laminar organs show different combinations of features.

Effect of Cyclic AMP on Protein Metabolism in Crustacean (*Callinectes sapidus*) Y-Organs.

Deug Woo Han and R. Douglas Watson, University of Alabama at Birmingham.

Paired Y-organs secrete ecdysteroid hormones that control cycles of growth and molting in crustaceans. Y-Organs are regulated, at least in part, by molt-inhibiting hormone (MIH), a peptide produced and released by the X-organ/sinus gland complex of the eyestalks. We are investigating cellular signaling pathways involved in regulation of Y-organ function. In the present studies, Y-organs were incubated *in vitro* in the presence of ^{35}S-methionine (^{35}S-met) and experimental agents that influence the cyclic AMP (cAMP) signaling pathway. In 4-hr incubations, 8-Br-cAMP (a cAMP analog) suppressed incorporation of ^{35}S-met into Y-organ proteins; the effect was concentration-dependant. Addition of cholera toxin (a Gs protein activator), IBMX (a phosphodiesterase inhibitor), or forskolin (an adenylate cyclase activator) likewise suppressed incorporation of ^{35}S-met into Y-organ proteins. The effect of cholera toxin was antagonized by KT5720 (a protein kinase A inhibitor). Incorporation of ^{35}S-met into Y-organ proteins was also suppressed by an extract of sinus glands. The combined results suggest that cAMP plays an important role in regulation of Y-organ function. We are currently investigating the link of protein synthesis to ecdysteroid production, and the possibility of cross-talk between cAMP and other cellular signaling pathways in Y-organs. Supported by the National Science Foundation (IBN-0213047).

NOTES ON THE BIOLOGY OF THE FRESHWATER JELLYSFISH (*CRESPEDICUSTA SOWERBII*) IN NORTHEASTERN ALABAMA.

George R. Cline, James R. Rayburn, Mijitaba Hamissou, and Frank A. Romano. Biology Dept. Jacksonville State University, 700 Pelham Road North, Jacksonville, AL 36265-1602.

The freshwater jellyfish (Craspedacusta sowerbii) a hydrozoan with a complex lifecycle and a cosmopolitan distribution. Little is known about the biology and ecology of this organism, as it's distribution is patchy, and it's occurrence is strongly seasonal. In Alabama, C. sowerbii is documented from 15 sites in 13 counties. The study site is a flooded quarry in northeastern Alabama. A sharp thermocline is found between 25-40 ft deep, where jellyfish tend to congregate around midday. Conductivity, turbidity, pH, and dissolved oxygen were collected at the surface, 15, and 30 ft using a water quality probe. Jellyfish were collected with plastic storage bags by scuba divers and returned to the lab to observe behaviors, to collect life history data, and for molecular and genetic analyses. Jellyfish first appeared in late June or early July. Population densities peaked in August though October. Numbers dropped dramatically in the late October and early November samples before the dive site closed in late-November. Gonadal tissue was collected from specimens collected from Aug. – Sept. All specimens had active sperm in at least one gonad. These specimens were then prepared for protein, genomic, and mtDNA analyses using RFLP. Some specimens were maintained in 10 gallon aquaria and fed brine shrimp. Jellyfish alternated bouts of swimming vertically with variable length periods of resting on the bottom of the tank. Videotape demonstrating feeding activity is presented.

CARAPACE SHAPE AMONG MULTIPLE TURTLE SPECIES.

David A. Delecki Jr., Anissa Delecki, and George Cline, Jacksonville State University, Jacksonville, Al, 36265.

Turtles are one of the most common groups of reptiles in the world. Modern turtles are found in aquatic, marine, or terrestrial habitats and are distributed worldwide in tropical and temperate environments. Turtles are also one of the most unusual groups in that they possess a hard shell. The bony shell of turtles is composed of the carapace and the plastron joined together by a bridge. The carapace is the top part of the shell and is covered by a layer of scales called scutes. The plastron is the bottom of the shell that protects the ventral side of the turtle. The carapace of turtles comes in many different shapes and sizes. Most studies that have examined carapace size in turtles have involved sexual dimorphisms. In a majority of studies a single character (i.e. carapace length) has been used to focus on broad comparisons among species. In studies involving more than one carapace measurement usually only one turtle species is used. In this study calipers were used to measure the carapace length, anterior carapace width, posterior carapace width, anterior carapace height, and posterior carapace height. These measurements were then analyzed to test for patterns related to the ecology and phylogeny of turtles.

DOES ENVIRONMENTAL STRESS INCREASE FLUCTUATING ASYMMETRY IN THE EASTERN MOSQUITOSIH?

Robert A. Angus and Eleanor J. Estes, Dept. of Biology, Univ. of Ala. at B'ham., Birmingham, AL 35294.

Fluctuating asymmetry (FA), defined as random differences between the left and right sides of a normally bilaterally symmetrical organism, has been used in numerous studies as an indicator of developmental instability, one possible cause of which is stress. This study focuses on two populations of eastern mosquitofish (*Gambusia holbrooki)* from small Florida coastal streams. Fish inhabiting the Fenholloway River live in a chemically polluted environment as a result of effluent from a paper mill. These fish presumably experience much more stress during development that those in unpolluted streams. The control fish were collected from Spring Creek, a nearby nonpolluted stream that does not receive effluent from a paper mill. In order to compare levels of FA, 9 morphometric (measured) and 5 meristic (counted) traits were measured on the left and right sides of 26 mature females collected from each site. The measurements were taken by one person, in order to minimize differences in personal bias and were taken twice in order to permit estimation of measurement error. To analyze the data, statistical methods developed for studies of FA by Palmer and Strobek were used. The methods include tests for aberrant individuals, outliers, measurement error, asymmetry and FA. The analyses for FA assess the differences between individuals, the two populations of fish and also take into account how the varying size of the fish and the trait affect FA. This study tests the hypothesis that stress caused by environmental pollution produces increased FA in mosquitofish. If correct, then FA could serve as a useful bioindicator of populations experiencing pollution-induced stress.

THE USE OF DUAL-ENERGY X-RAY ABSORPTIOMETRY TO DETERMINE BODY COMPOSITION IN FISH. Randy J. Watts and Stephen A. Watts, Dept of Biology, Univ. of AL at Birmingham, Birmingham, AL 35294. Hugh S. Hammer, Aquatic Sciences Dept, GSCC, Gadsden, AL 35902. Maria S. Johnson and Tim R. Nagy, Nutrition Science, Univ. of AL at Birmingham, Birmingham, AL 35294.

Body composition analysis provides information on energy allocation and utilization from many animal models. The use of non-invasive techniques for determining body composition, including bioelectrical impedance, electrical conductivity, body condition indices and isotopic dilution have shown limited success for determining fat, lean and ash content in many animal models, but have been validated for human and some smaller mammals. Fat composition of fish can be a useful predictor of body condition, but evaluation has previously required destructive sampling. Dual-energy X-ray absorptiometry (DXA) was originally designed to detect osteoporosis in humans. DXA can also be used to determine other components of body composition such as fat mass and lean tissue mass. Recent studies indicated that DXA can be used to accurately determine fat and lean composition in tilapia. Trials are underway to evaluate DXA for analysis of catfish. The use of DXA would allow longitudinal studies with individual subjects under a variety of experimental conditions. DXA could provide a valuable tool for finfish analysis and result in optimal management strategies for aquacultured species.

INHIBITION OF hTERT IN HUMAN BREAST CANCER CELLS USING RNA INTERFERENCE. **Amanda P. Cunningham, Liang Liu, Rebecca Wylie, Sharla Phipps, Lucy Andrews, and Trygve Tollefsbol, Dept. of Biology, UAB, Birmingham, AL 35294.**

RNA interference is a relatively recent innovation that possesses potential as a therapeutic agent for a variety of diseases either alone or in conjunction with existing therapies. We have chosen to use RNA interference as a means to knock down hTERT expression in the estrogen receptor negative human breast cancer cell line MDA-MB-157. hTERT is the catalytic component of the enzyme telomerase which is expressed in >90% of human cancers, but with few exceptions is not expressed in normal somatic cells. We believe this selective quality makes hTERT an attractive therapeutic target and RNA interference a promising means of achieving hTERT knock down in human cancer cells. We have shown hTERT mRNA to be effectively knocked down in MDA-MB-157 cells by all three of our preliminary retroviral constructs for shRNA delivery by RT-PCR analysis after 8 weeks of treatment.

AROMATASE mRNA LEVELS IN THE BRAIN OF *TRACHEMYS SCRIPTA*.

Keela L. Dodd, Chris Murdock, and Thane Wibbels, Department of Biology, Birmingham, AL 35294-1170.

Many reptiles exhibit temperature-dependent sex determination (TSD), in which the incubation temperature of the egg determines the sex of the developing embryo. The physiology of TSD is not well understood; however, estrogen has been hypothesized to play a key role. One hypothesis suggests that female incubation temperatures result in the increased production of mRNA for the enzyme cytochrome P450 aromatase that catalyzes the conversion of androgens to estrogens. Further, it has been suggested that the brain may be the source of aromatase activity prior to or during sex determination. In the current study, a quantitative-competitive RT-PCR was validated for quantifying the aromatase mRNA levels in the brain tissue of *Trachemys scripta*, a turtle with TSD. Eggs were incubated at male- and female-producing temperatures, and tissues were harvested at developmental stages before, during, and after the thermosensitive period of TSD. A quantitative-competitive RT-PCR was preformed using a RNA competitor as an internal standard in each reaction tube. The competitor molecule was a fragment of the endogenous aromatase mRNA that contained a deletion, allowing it to be differentiated from endogenous aromatase using gel electrophoresis. The intensity of the endogenous and competitor bands were measured digitally and then used to estimate the amount of endogenous aromatase in each sample. All examined tissues had low or non-detectable levels of aromatase. Further, no significant differences were found between embryos at male versus female temperatures. The results do not support the hypothesis that brain aromatase expression plays a pivotal role in TSD.

SEDIMENTATION IN ROSS CREEK AS A RESULT OF CONSTRUCTION.

Andrew Housholder, Samford University.

A land-developing company is in the process of building a 600-acre development in the Shannon Valley. The construction appears to be dumping large amounts of sediment into Ross Creek, which in turn flows into Shades Creek. When observing the stream, there is no evidence of benthic macroinvertebrates or bottom-laying fish, and the natural environment around the stream has been disturbed by the removal of riparian vegetation. The sediment from the construction is contributing to the poor stream life of Ross Creek. To prove this hypothesis, one-liter water samples were taken from five sites along Ross Creek. Samples were taken on two days during rainfall and one day when it had not rained for three days. The samples were tested for total suspended solids and total dissolved solids. The results showed that the levels of suspended and dissolved solids from every sample site on Ross Creek increased after rainfall as opposed to dry periods. In some instances, the levels increased as much as 500%. Every sample taken from Ross Creek had higher levels of solids than same-day samples taken from Shades Creek upstream from the entry point of Ross Creek. The construction is disrupting the aquatic environment of Ross Creek. The company developing the land is responsible for making sure that the water is not degraded, and it needs to take proper action to stop runoff into the waterway.

Down-Regulation of Telomerase in Human Promyelocytic Leukemia Cells and Estrogen Receptor Negative Breast Cancer Cells by Epigallocatechin-3-Gallate (EGCG). *Joel B. Berletch*, Mitchell S. Pate, Lucy G. Andrews, Trygve O. Tollefsbol. University of Alabama at Birmingham.

Aging can be characterized as a series of time-dependent physiological and anatomical changes that reduce the capacity to adjust to various stresses presented in life. One such age related stress is cancer. Studies have shown that 85-95% of cancer cells over-express a ribonucleoprotein called telomerase. Telomerase expression is necessary to immortalize cancer cells by maintaining the ends of chromosomes therefore preventing attrition. The polyphenolic compound epigallocatechin-3-gallate (EGCG) has been shown to decrease telomerase activity in cancer cells. Many mechanisms have been proposed but none have been well established. It has been shown that EGCG has the capacity to down-regulate telomerase in an estrogen receptor positive breast cancer cell line, MCF-7. However down regulation of telomerase in promyelocytic leukemia cell line HL-60, due to the effects of EGCG, has not been well documented. By performing the telomeric repeat amplification protocol (TRAP assay), this study demonstrated that EGCG has a down-regulating effect in Leukimia cells. Further studies involving EGCG and current cancer treatments may be helpful in elucidating the mechanism utilized by EGCG.

A PROPOSED INDEX OF BIOLOGICAL INTEGRITY FOR AQUATIC MACROINVERTEBRATES. L. J. Davenport and W. Mike Howell, Department of Biology, Samford University, Birmingham, AL 35229.

While aquatic macroinvertebrates have long been used to assess the health of streams, different investigators choose different metrics to determine that health. Current "popular" metrics include the total number of taxa and the number or percentage of organisms in specific groups, such as EPT (Ephemeroptera, Plecoptera and Trichoptera), chironomids, and the most dominant taxon. In contrast, Hilsenhoff's (1987) Biotic Index uses tolerance values established for all taxa, and an average tolerance value is computed. In a manner similar to Karr's (1981) Index of Biological Integrity for fishes, we attempted to combine the above metrics (plus others) into a single index for aquatic macroinvertebrates. Sample data utilized is from our 2001-2003 studies at fifteen sites on the upper Cahaba River.

Detection *Vibrio parahaemolyticus* O3:K6 using real-time PCR with Taqman fluorescent probes in Gulf of Mexico water and shellfish.

Amy V. Rizvi and A. K. Bej, University of Alabama at Birmingham, AL-35294.

Vibrio parahaemolyticus is a Gram-negative bacterium and a natural inhabitant of warm costal waters. It is commonly found in shellfish and other crustaceans, and is responsible for causing gastroenteritis when consumed in raw or poorly cooked seafood. Conventional microbiological methods of detection of this pathogen are relatively time consuming. Therefore the need for rapid, more accurate detection of pathogens in seafood has lead to the development of a multiplex real-time PCR assay. This assay was developed by optimizing the use of Taqman probe-based multiplexed PCR parameters and testing *tl* and ORF8 gene-specific oligonucleotide primers and probes in an effort to establish a rapid, specific and sensitive real-time method of detection of total *Vibrio parahaemolyticus* and the pandemic serovar O3:K6 in oyster tissue homogenate and Gulf of Mexico water. The specificity of these primers was tested for amplification of a 450 bp *tl* and a 369 bp ORF8 gene fragment representing all *V. parahaemolyticus* and post-1996 clinical isolates of pandemic serovar O3:K6, respectively. The sensitivity of detection was 10 pg of purified genomic DNA and 10^3 cfu in 1 ml in pure culture. Enrichment of the seeded samples of both oyster tissue homogenate and gulf water for 5 h or 8 h resulted in a sensitivity of detection level of 1 cfu in 1 g of seeded enriched oyster tissue homogenate or 1 ml gulf water. Rapid, reliable and sensitive detection of *V. parahaemolyticus* O3:K6 would help the shellfish industry and ISSC in taking appropriate measures for routine monitoring for this pathogen, thereby preventing disease outbreaks and consequently protecting consumer health.

INCUBATION TEMPERATURES IN GREEN TURTLE NESTS AT FRENCH FRIGATE SHOALS, HAWAII.

Jennifer Estes, Thane Wibbels, Dept. of Biology, Univ. of Ala. at Birmingham, Birmingham, AL 35294. George Balazs, National Marine Fisheries Service, Honolulu, Hawaii.

The green sea turtle (*Chelonia mydas*) possesses temperature-dependent sex determination (TSD) in which the incubation temperature of the egg determines the sex of the hatchling. This form of sex determination is of evolutionary significance because it has the potential of producing a wide variety of sex ratios. Hatchling sex ratios resulting from TSD are also of conservational and ecological interest, since they can affect the recovery of endangered populations. French Frigate Shoals (FFS) is an atoll located approximately 800 km northwest of Oahu in the Hawaiian Archipelago. Over 90% of Hawaiian green turtle nesting occurs on FFS. The purpose of this study was to evaluate nest temperatures in an effort to estimate sex ratios. Sand and nest temperatures were monitored on FFS during the 1998-2002 nesting seasons. The average incubation temperatures during the middle third of incubation were used to predict sex ratios. The pivotal temperature of sex determination for Hawaiian green turtles is unknown. If the pivotal for Hawaiian green turtles is similar to that of green turtles in Suriname and Costa Rica, where the pivotal temperatures have been estimated, then the majority of temperatures recorded in this study would be below the pivotal. This would suggest an overall male-bias. Alternatively, the Hawaiian green turtles may have evolved a lower pivotal temperature, which could result in unbiased or even female-biased sex ratios at these temperatures.

ZEBRAFISH GILLS: LOCALIZATION OF ALKALINE AND ACID PHOSPHATASES.

Chen Jiang and Glenn M. Cohen, Dept. Bio. & Environ. Sci., Troy State Univ., Troy, AL 36082. Eric G. Spokas, Dept. of Chemistry, Rowan University, Glassboro, NJ 08028.

Fish gills continuously perform respiratory, excretory, and ionoregulatory functions. Although enzymatic activities of fish gills have been extensively studied, particularly Na^+/K^+-ATPases, scant attention has been paid to alkaline and acid phosphatases, two useful marker enzymes for structural and functional studies. Our objectives in the present study were to map the localization of alkaline and acid phosphatases in the zebrafish gills. We used a napthol AS-MX phosphate-stabilized diazonium salt for demonstrating alkaline phosphatase activity (fast blue BB) and acid phosphatase activity (fast red violet LB). We embedded in Spurr epoxy and cut 1-2 μ sections. Purified methyl green served as a cytoplasmic and nuclear counterstain. We found sharply contrasting staining patterns for alkaline and acid phosphatases in primary and secondary lamellae. For example, alkaline phosphatase intensely stained the secondary lamellae; all cell types stained. Generalized alkaline phosphatase staining stopped abruptly at the bases of the secondary lamellae where they connect to the primary lamellae. By contrast, acid phosphatase strongly stained cells in both the primary and secondary lamellae as evidenced by the presence of reaction produce sprinkled cytoplasmically. Acid phosphatase displayed a wider distribution than alkaline phosphatase. Neither enzyme stained the cartilage in the primary lamellae. Alkaline phosphatase might contribute to ion transport as suggested in killifish chloride cells and blue crab gills. Acid phosphatase indirectly reflects metabolic activity.

TELOMERASE INHIBITION BY UAB-30 RETINOIC ACID AS A POTENTIAL TREATMENT FOR HUMAN BREAST CANCER.

Rebecca C. Wylie, Jonathan D. Matlock, Sharla Phipps, Lucy G. Andrews, Trygve O. Tollefsbol Dept. of Biology, Univ. of Ala. at Birmingham, AL 35294.

Breast cancer, one of the leading causes of cancer-related death in women, currently presents limited treatment options due to several factors, including toxicity and lack of sustained drug potency. Inhibition of the telomerase enzyme has offered new hope in treatment of breast tumors with a decreased likelihood of adverse side effects. This enzyme, which maintains the telomeric ends of chromosomes, is a critical component in the control of chromosomal stability, cellular senescence, and neoplastic transformation. Although silenced in almost all normal somatic tissue, telomerase is active in over 90% of human carcinomas, including breast cancer. Previous research has shown that inhibition of the telomerase enzyme strongly correlates with many antitumorigenic effects. Retinoic acids (RAs) have been shown in several cancer studies to effectively down-regulate the transcription of hTERT, the catalytic subunit of telomerase, thereby decreasing the enzyme's activity. In this study, a new synthetic retinoid, UAB-30 RA, was compared with the more commonly studied natural RAs, 9-*cis* and ATRA, in the treatment of MCF-7 human breast cancer cells. Effectiveness of treatment and levels of toxicity were measured by the Telomerase Repeat Amplification Protocol, RT-PCR, soft agar analysis, and Apotag. It was found that the retinoids effectively down-regulated telomerase activity and hTERT mRNA, decreased cellular proliferation and tumorigenicity, and induced apoptosis, with UAB-30 resulting in less overall toxicity compared to the natural RAs.

THE STATUS OF THE POPULATIONS OF THE FLATTENED MUSK TURTLE (*STERNOTHERUS DEPRESSUS*) IN BANKHEAD NATIONAL FOREST AND SMITH LAKE, ALABAMA, WITH EMPHASIS ON SEX RATIOS AND THE DISTRIBUTION OF SIZE CLASSES WITHIN POPULATIONS.

Sherry Holmes and Ken Marion, Department of Biology, Univ. of Ala. at B'ham, Birmingham, AL 35294-1170.

Previous studies on the population status of *S. depressus* indicated that its numbers were declining. It is currently listed as threatened under the Endangered Species Act. After two seasons (2002 and 2003) of trapping efforts in the Bankhead National Forest and surrounding areas, the data indicate that populations may not be recovering. In the stream site that has historically held the densest population, 2002 data indicated that the population may have stabilized, but in the subsequent season, atypical weather caused unfavorable trapping conditions and may have produced a false indication of decline. The sex ratio of flattened musk turtles in this site has gone from 2.2:1 (M:F) in 1985 to a 1:1 in the 2002-2003 seasons. Although data indicate that at least some recruitment is occurring in the upper inundation zones of Smith Lake in the Brushy Creek and Sipsey Forks and that populations exist in isolated pockets and coves of the reservoir, the size class distribution is heavily skewed toward the larger size classes. This research was made possible by the support of the U.S.D.A. Forest Service, Alabama Power, The Nature Conservancy of Alabama, and the Birmingham Audubon Society.

A STUDY OF SALT STRESS RESPONSES OF THREE TAXONOMICALLY DIFFERENT PLANT SPECIES.

Mijitaba Hamissou and Amora W. Hicks. Biology Department, Jacksonville State University, Jacksonville, AL 36265, USA.

Increasing demands for food quality and quantity are two major causes for over irrigation and over fertilization of agricultural lands. These two factors combined are contributing to increase in soil salinity, creating impediments to plant growth and development. Plants cannot extract water from the soil unless the water potential in the root is less than the water potential in the surrounding soil. Plants growing in saline environments must also cope with the potential toxic effects of Na^+ ions. Certain plant species are known to cope with soil salinity by synthesizing small molecular weight proteins or by accumulating osmolytes in response to high level of soil salinity. *Osmotin*, a 26 KD alkaline protein is believed to accumulate in the vacuoles of salt stress tobacco cells. Glycine betaine, an osmolyte, is known to be synthesized by members of the Chenopodiaceae in the chloroplast then transported through the phloem to the growing tissues when grown in saline environment. Despite large published research in salt stress, there still is no single salt tolerance biomarker used in salt stress research. The objective of this study is to investigate some molecular and physiological responses of three plant species exposed to increasing concentrations of NaCl. Plants were grown in potted soils, watered and fertilized for 4 weeks then irrigated with NaCl solutions of concentrations ranging from 100 mM to 400 mM. Preliminary data indicated that soil salinity repress root elongation and caused mild reduction in plant relative water content. Our results indicated a possible alteration of protein synthesis by plants subjected to prolonged salt treatment.

SEX RATIO OF HAWKSBILL SEA TURTLE HATCHLINGS FROM NESTS LAID IN SEYCHELLES FROM 1999-2002.

Amber Park and Thane Wibbels, Univ. of Ala. at Birmingham, Birmingham, AL 35294. J.A. Mortimer, S. Roberts, A. Rulie, Seychelles Ministry of the Environment, Victoria, Mahe Republic of the Seychelles.

Temperature-dependent sex determination (TSD) is a process in which the incubation temperature of the egg affects the sex of the hatchling. The endangered hawksbill sea turtle, *Eretmochelys imbricata,* possesses TSD, which may allow it to produce a variety of sex ratios. Therefore, TSD can affect ecological, reproductive, and conservational aspects of the hawksbill population. Seychelles is a group of islands located about 1,000 miles off the coast of Kenya and hosts a relatively large population of hawksbill sea turtles. The goal of the current study was to estimate hatchling sex ratios of hawksbill sea turtles produced on Curieuse and Bird Island in the Seychelles. Data loggers were used to measure the incubation temperatures of nests, as well as sand temperatures during the 1999, 2000, 2001 and 2002 nesting seasons. Hatchling sex ratios were predicted based on the average incubation temperatures during the middle third of the incubation. The results indicated a female bias for three of the four nesting seasons.

MARINE SPONGES FROM THE ALABAMA COAST: OIL RIGS AS ARTIFICIAL REEFS.

Patrick M. Erwin and Robert W. Thacker, Dept. of Biology, Univ. of Ala. at Birmingham, Birmingham, AL 35294.

Marine sponges inhabit oil rigs off the coast of Dauphin Island, Alabama, in the northern Gulf of Mexico. The oil rig pilings function as artificial reefs by providing "islands" of hard substrate for colonization by sessile invertebrates in an otherwise soft-bottomed community. The paucity of hard substrate in these environments suggests intense competition among individuals encrusting on the rigs. This study was designed to characterize the sponge communities on the rigs and to investigate the factors allowing these sponges to be successful in a space-limited environment. A total of 7 rigs were surveyed for sponge diversity. Each rig harbored from 2 to 5 sponge species. Sponge species were identified using standard taxonomic methods and sequence analysis of the entire ITS-2 and partial 28S ribosomal DNA (rDNA) subunits. The bright orange sponge *Hymeniacidon heliophila* dominated the sponge community and was found in high abundance on all rigs surveyed. A purple sponge belonging to the family Halichondridae was the second most common species, though in much lower abundance, often found growing near large colonies of *H. heliophila.* Other species found in very low abundance were *Chelonaplysilla* sp., *Haliclona* sp., and *Cliona viridis.* Differences in sponge abundance and diversity were minimal among the rigs visited. To assess the anti-fouling activity in the sponges surveyed, gel plates were constructed using sponge homogenate and housed in small Petri dishes. To investigate the bacterial communities associated with rig sponges, a clone library of 16S rDNA bacteria sequences is being constructed.

ACOUSTIC CAVITATION AND ADVANCED CHEMICAL OXIDANTS AS MECHANISMS TO ERADICATE MARINE BACTERIA AND MACROINVERTEBRATES FROM BALLAST WATER. Meghana Gavand*, Ananthakrishnan Ananthanarayanan[+], James McClintock*, Charles Amsler*, Robert Peters[+], Shirley Clark[++]. *Dept. of Biology, Univ. of Alabama at Birmingham, AL 35294. [+]Dept. of Civil and Environmental Engineering, Univ. of Alabama at Birmingham, AL 35294. [++]Penn State Univ. at Harrisburg, PA 17057.

Ballast water is considered to be an important factor contributing to the introduction of invasive marine organisms. Using a model marine bacterium (*Vibrio alginolyticus*), we first determined the mortality during batch treatment exposure to either a series of acoustic cavitation frequencies [ranging from 800 Hz to 4 kHz] (range = 4-35% mortality), different concentrations of hydrogen peroxide [up to 1000 parts per million (ppm)] (range = 1%-33% mortality), or ozone [up to 1000 ppm] (range = 0.6-29% mortality). Subsequent combinations of acoustics coupled with hydrogen peroxide and ozone resulted in optimized maximal mortality of 42%. Using an invertebrate model, brine shrimp cysts and juveniles (*Artemia salina*) were then subjected to these predetermined optimized conditions and percent mortality was measured. The incidence of mortality for brine shrimp cysts and juveniles under bacterial-optimized conditions (1.4 and 1.8 kHz, 100 ppm ozone, and 100 ppm hydrogen peroxide) was 80-91% and 97-100%, respectively. Acoustic cavitation combined with chemical oxidants may be an effective method to treat ballast water to reduce invasive marine species. Supported by a grant from the US Fish and Wildlife Service to R. W. Peters, C. D. Amsler, and J. B. McClintock.

PHLOXINE B IS A POTENTIAL PROPHYLACTIC TREATMENT AGAINST CHANNEL CATFISH PRE-INFESTED WITH *ICHTHYOPHTHIRIUS MULTIFILIIS*. Department of Biology, Jacksonville State University, Jacksonville, AL 36265. Mark Haygood, Benjie Blair, Mark Meade, Charles Olander, and Ashley Ward.

Ichthyophthirius multifiliis ("*Ick*") is a ciliated, parasitic protistan that commonly infests freshwater fish. Economically, "*Ick*" does not cause a major problem; however, secondary diseases usually precede "*Ick*" infestation resulting in mortality. By eliminating "*Ick*", other diseases can be prevented as well. Currently, copper sulfate is the most common treatment used in aquaria and pond environments. The toxic effects of this chemical supercede its benefits. These detrimental effects have increased the need for a safe therapeutant that is approved for use in the food fish industry. Studies conducted on phloxine b have illustrated positive results against "*Ick*" post-infestation and pre-infestation in channel catfish, *Ictalurus punctatus*. At a phloxine b concentration of 10 ppm, a 70% mean survival rate was observed while at 0 ppm, a 100% mortality rate was observed in post-infestation studies. Similarly, in a pre-infested study performed, a 50% survival rate was noted at a phloxine b concentration of 10 ppm while at 0 ppm, a 0% survival rate was noted. These results demonstrate phloxine b to be a potential prophylactic treatment against *Ichthyophthirius multifiliis*.

CHEMISTRY

SYNTHESIS AND EVALUATION OF SOME 4-AZA-20α-AMINOPREGNANES AS ANTIMICROBIAL AGENTS, Norman J. Doorenbos, Department of Pharmacal Sciences, Harrison School of Pharmacy, Auburn University, Auburn AL 36849 and Fuad H. Jawad, College of Pharmacy, University of Baghdad, Baghdad, Iraq..

Heterocyclic steroids prepared in our synthetic azasteroid program became leads to anabolic, antiandrogenic, anti-BPH, birth control, anti-inflammatory, antialdosterone, hypocholesterolemic, neuromuscular relaxant, antibacterial and antifungal drugs. The most promising of these derivatives were 4-azasteroids, first prepared in our program.

The more active azasteroid antibiotics were cholestane derivatives. They controlled growth of antibiotic resistant Gram-positive bacteria, molds and yeasts, often at concentrations as low as one part per million. This presentation will describe the first syntheses and antimicrobial evaluations of novel 4-aza-20α-aminopregnanes. They were synthesized from pregnenolone and/or progesterone. They will be compared with previously reported active 4-azasteroids.

EVALUATION OF LIGHT SCATTERING PARTICLES AS A MEANS TO INCREASE PATH LENGTH FOR ABSORPTION EXPERIMENTS. In Cho, Yoon Cho, and Jon Thompson, Department of Chemistry, Troy State University, Troy, AL 36082.

We have evaluated inclusion of nanometer sized (109 – 3170 nm) polystyrene particles within the standard sample and reference cells of a dual beam spectrophotometer as a means to increase optical path length through the absorbing sample. It is believed that photons are multiply scattered as they "diffuse" through the highly turbid sample prior to emerging from the optical cell and being detected. These multiple scatter events lead to a net increase in average pathlength from the standard 1 cm commonly employed to path lengths approaching 10 cm when a high concentration of 109 nm particles are used as the scattering material. This increase in path length should allow for more sensitive detection of a variety of absorbing species in solution.

DESIGN AND IMPLEMENTATION OF AN INEXPENSIVE, PORTABLE CAPILLARY ELECTROPHORESIS (CE) INSTRUMENT.

Greg Anderson, Utkarsh Singh, and Jon Thompson, Department of Chemistry, Troy State University, Troy, AL 36082.

Over the past 20 years, capillary electrophoresis (CE) has emerged as a popular method for analytical separations of ions in solution due to the highly efficient separations and rapid analysis times the technique allows. The technique is based upon the differential migration of ions through a narrow bore (5 – 100 μm) fused silica tube when under an applied electric field (10 – 30 kV). Despite the techniques utility, many Universities are unable to purchase commercially available CE instrumentation due to funding limitations. In our work, we have designed and developed an instrument for performing capillary electrophoresis separations on a budget of ~ $500. Our instrument is constructed from a modified student microscope to allow for on-column fluorescence detection using a light emitting diode (LED) as an excitation source. An inexpensive DC-DC converter is used to provide high voltage for the electrophoresis separation. We have applied our instrument to the determination of riboflavin and flavin mononucleotide (FMN) in solution. It has been found that our instrument is capable of detecting 20.5 μg/mL of riboflavin and 21.4 μg/mL of FMN in solution.

QUANTITATIVE ANALYSIS OF OIL ABSORPTION BY GRAFTED BAGASSE IN SIMULATED OCEAN ENVIROMENT.

Mikita R. Brown, Veronica E. Blackman, and Adriane G. Ludwick, Tuskegee University, Tuskegee AL 36088.

Grafted bagasse is an environmentally safe oil absorbing material composed of compressed sugar crane reacted with the following compounds:10% stearic acid, 4% zinc oxide, 2% t-butylamine, 2% sodium hydroxide, and 1% ammonium carbonate. The previous work of Mohamed Abdulla proved that grafted bagasse absorbs oil from pure water. The purpose of this experiment was to conduct a quantitative analysis of the absorbing capacity of bagasse from pure water and simulated ocean environments using various salt water concentrations: 5% NaCl and 10% NaCl. Quantitative analysis was performed using gas chromatography; column conditions were set for 2000C and run for 25 minutes. A calibration curve was formatted using known concentrations of oil vs. water, and two replicates were evaluated to determine the amount of oil present in each extraction. Extractions were done by separating oil volumes from water using ethyl ether, and oil volumes from bagasse using dichloromethane, to yield the following oil volumes: from ethyl ether extractions 30.0 +/- 0.12 ul, 29.7 +/- 0.09 ul, 30.5 +/- 0.54ul for pure water, 5% NaCl, and 10% NaCl samples respectfully, and in dichloromethane extractions 1.117 +/- 0.035 mL, 1.431 +/- 0.016 mL, 1.401 +/- 0.024 mL of oil was absorbed from bagasse from pure water, 5% NaCl, and 10% NaCl samples respectfully. Based on this data, grafted baggase expresses a nearly equal absorbing capacity in both pure and salt-water environments.

GALVANIC PLATING OF ZINC ONTO COPPER,

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Zinc metal will spontaneously plate from zinc solution onto copper metal in an electrochemical cell. The reaction is due to the reduced activity of zinc atoms on a copper surface compared to zinc atoms on a pure zinc surface. It was found that galvanic cells having pure zinc and pure copper electrodes in electrolytes containing zinc ions have electric potentials which vary with the pH of the electrolyte. Our study measured cell potentials of 0.74 V, 0.77 V and 0.95 V in solutions of pH 2.3, 4.7 and 14, respectively. The ultimate thickness of the zinc layer that deposits on a copper surface was determined by digesting samples in nitric acid and measuring the resulting concentrations of zinc and copper using atomic absorption and visible spectroscopy. Similar to the initial cell potentials, the thickness of zinc achieved varied with the pH of the electrolyte, with thicknesses of 0.028 mm, 0.038 mm and 0.059 mm deposited from solutions having pH 2.3, 4.7 and 14. By estimating the cell capacitance and measuring the initial rate of voltage increase after a jumper wire was removed, an estimate of initial reaction rates for galvanic cells were obtained. In pH 4.7 electrolyte, the initial rate of deposition of zinc was 1.5×10^{-13} mol cm^{-2} s^{-1}. The corresponding value in strongly alkaline solution was found to be 6.0×10^{-13} mol cm^{-2} s^{-1}. A laboratory exercise based on these experiments and suitable for General Chemistry Laboratory is posted at http://www2.una.edu/mmoeller.

GEOGRAPHY, FORESTRY, CONSERVATION, AND PLANNING

DISTRIBUTION OF MERCURY IN SEDIMENT OF THE SNOW CREEK WATERSHED, CALHOUN COUNTY, ALABAMA,

David Steffy, Jeremy Franklin, Joshua Lang, Rachael McCoy, Charity Novick, Charles Stinson, and Alfred Nichols. Department of Physical and Earth Sciences, Jacksonville State University, 700 Pelham Rd. N, Jacksonville, AL 36265

An investigation of mercury contamination of sediment has revealed levels 100's times higher than background in some urbanized areas of the Snow Creek Watershed. Background levels were estimated to be 0.060 mg/Kg. Elevated levels of mercury as high as 6.520 mg/Kg were found in the City of Oxford's recreational park, which lies adjacent to Snow Creek. Gradual erosion of contaminated sediment from the park was deposited in Snow Creek. Erosion by Snow Creek has redistributed the contaminated sediment downstream into its receiving stream, Choccolocco Creek and its associated floodplain.

MONITORING URBAN EXPANSION OF BAMAKO, MALI, USING PRINCIPAL COMPONENT ANALYSIS OF MULTI-TEMPORAL LANDSAT DATA.

Yaw A. Twumasi, Center for Hydrology, Soil Climatology, and Remote Sensing, Dept. of Plant and Soil Science, Alabama A&M University, Normal, AL 35762. Andrew Manu, Dept. of Agronomy, Iowa State University, Ames, IA 50011. Tommy L. Coleman, Center for Hydrology, Soil Climatology, and Remote Sensing, Dept. of Plant and Soil Science, Alabama A&M University, Normal, AL 35762.

The purpose of this study is to use remote sensing technology in a time series analysis to investigate the growth of Bamako, the capital city of Mali within a twelve-year period. In pursuit of this objective, this study uses Landsat Thematic Mapper (TM) remotely sensed data acquired on 13 October 1987 and 28 October 1999 to monitor urban expansion. All the images were radiometrically normalized and pre-processed to remove speckles and clouds. These were later enhanced using histogram equalization technique. Transformation of the images was done using Principal Components Analysis (PCA) technique. Results show that principal components PC2 and PC3 highlight changes in the 1999 image. A color composite of 1999 image formed by displaying PC4 as red, PC3 green and PC2 blue also showed evidence of urban expansion. Areas around the fringes of the city that were vegetated in 1987 image were devoid of vegetation in the 1999 image. This vegetation loss was partly due to urban encroachment. Results of the components PC1, PC2, PC3 and PC4 for the 1987 and 1999 images were later used to perform unsupervised classification. Six major land cover classes were identified notably - water, urban, agriculture, residential, trees, herbaceous vegetation and open land.

REDISTRICTING, PLANNING AND THE ALABAMA BLACK BELT: CONSEQUENCES OF THE ONE MAN, ONE VOTE RULE IN ALABAMA.

Elton J. Thomas, Dept. of Community Planning and Urban Studies, Alabama A & M Univ., Huntsville, AL.

The relationship between redistricting and planning throughout history has been a divisive issue in policy administration. At the congressional level, redistricting regarded political posturing, negotiation and bargaining as newly drawn districts in the decennial process, sought to maintain a balance of shifting rural and urban interests. On the local level, planners were concerned about managing population data, statistics, and geographical data to insure that rural and urban benefits were safeguarded as they planned communities. In Alabama, particularly in the Black Belt region, the One Man, One Vote Rule has and continues to cultivate planning and opinionated debate in social and political arenas. The researcher uses the reallocation and appropriations theory of McCubbins and Schwartz to examine how congressional redistricting has had an impact on rural systems from 1970-1990. An analysis of the 1980 Supreme Court case of Mobile v. Bolden (446 U.S. 55) is also used to showcase the most recent and significant redistricting issues that affect the Alabama Black Belt. This study will answer the following: Why is redistricting a significant planning concern? Why is redistricting a planning concern in the Alabama Black Belt? What areas of planning are most affected?

POLITICS IN PLANNING

Octavia N. Hall and Constance Wilson, Department of Community Planning and Urban Studies, Alabama A&M University, Normal, AL 35762

In a Democracy, the citizens of a country are encouraged to participate in their government. Despite this focus on participation, many people feel that they do not truly have a voice in what happens to them or their communities. There is, however, at least one arena where citizens can express their opinions and be heard. That arena is the planning process. Through public meetings and the development of community organizations, citizens are given a forum from which they can express their concerns about the future of their communities. Occasionally, citizens are left out of the planning process until it is absolutely necessary to include them. Even when this happens, citizens still have the power to shape decisions. This was the case when developers came to Huntsville, AL and attempted to take a piece of a treasure that Huntsville residents were unwilling to compromise—the Big Spring. This Study looks at the principal players and the role that citizens played in shaping what happened at Big Spring.

ANALYSIS OF TRENDS ON FORESTED LAND AREAS: THE CASE OF MISSISSIPPI.

Edmund C. Merem, Dept. of Urban and Regional Planning, Jackson State Univ., Jackson, MS 39211. Yaw A. Twumasi, Center for Hydrology, Soil Climatology, and Remote Sensing, Dept. of Plant and Soil Science, Alabama A&M Univ., Normal, AL 35762.

The state of Mississippi compared to its size and land area has enormous tracts of land covered with forests with a whole range of ecological and economic benefits for society and other life forms. In essence, it provides habitats for different species of animals, and acts as a carbon sink for greenhouse gases. In the last several years, the forestry sector of Mississippi has assumed a leading role as one of the essential components of the state's economy. While the sector acts as a major provider of jobs and economic opportunities, the widespread harvest of timber on a yearly basis to boost the states' economy has occurred with limited adoption of forest management plans by most landowners. This is bound to affect the future use and access to forests products if proper efforts are not made to address the problem. Notwithstanding, the fact that Mississippi's forest acreage has remained stable for nearly four decades, the impacts of extensive logging by the timber industry could emerge as a potential ecological problem in the future if no attention is paid to proper planning and management of the resource. The paper presents an analysis of ecological and socio-economic trends associated with the Mississippi forestry sector. The project applies the use of forest statistics, Time series analysis and Geographic Information Systems to document the trends. This is followed by a synthesis of the factors leading to the current state of forested land. The recommendations for future lines of action range from the adoption of management plans to forestry accounting.

A CASE STUDY IN THE USE OF EMINENT DOMAIN POWERS BY THE CITY OF ALABASTER, ALABAMA.

Nicholas Nene, and William K. McAllister, Department of Community Planning and Urban Studies., Alabama A & M Univ. Normal, AL 35762

In the early 1790's, the U.S Supreme court described the power of eminent domain as "where the government takes someone's property for a public use – as 'the autocratic power'." In 2003, a major developer announced that it was going to pursue redevelopment near a major interstate highway. The commercial development would result from the assembly of three hundred and fifty acres. The key problem arose when a few property owners refused to sell their land, a total of twelve acres, to the developer. Later that year the city of Alabaster voted to acquire the last acreage by the use of eminent domain in order not to loose this development. To meet the requirements of the Alabama Constitution, Alabaster designated the area as blighted. What constitutes to a blighted area? Eminent domain has the potential to destroy lives and livelihoods by uprooting people from their homes and business people from their shops. This presentation will assess the use of eminent domain powers by the city of Alabaster, Alabama. It will outline the key issues and show the way eminent domain was used to condemn land so that a local developer would acquire the land in the name of bringing more taxes to the city.

RURAL TRANSIT PERFORMANCE MEASUREMENT: A PILOT STUDY TO TEST A PERFORMANCE MODEL FOR RURAL TRANSIT SYSTEMS IN ALABAMA.

Shundreka R. Givan, Dept. of Community Planning & Urban Studies, Alabama A&M University, Normal, AL 35762.

Performance measurement for rural transit systems is essential for determining ways to improve productivity and the quality of service being delivered. Rural transit systems have been typically measured in comparison to other transit systems or evaluated over a period of time to assess system performance. As competition to secure funding grows and the expectations of passengers increase, detailed measures of efficiency, effectiveness, and goal attainment are becoming more important for determining whether transit systems meet funding requirements and are providing an essential and valuable community service. The state of Alabama is seeking to implement a standard performance evaluation model to be used as a statewide performance measurement tool for rural public transit systems. The purpose of this study is to test the validity of the recommended model and to determine whether this model could serve as a standard evaluation tool for rural transit systems given disparities in geographical settings, population density, and diverse socio-economic factors. The objectives of the study are (1) test the recommended performance evaluation model on selected rural public transit systems in Alabama, (2) evaluate how the factors of the service area characteristics align with the performance outcome of each selected rural transit system based upon the analysis and results of objective 1, and (3) assess the model's effectiveness as an instrument for measuring transit system performance.

LEAPFROG ANALYSIS OF LAND DEVELOPMENT AT THE URBAN FRINGE.

Brent Cunningham and William K. McAllister. Dept. of Community Planning and Urban Studies. Alabama A&M University, Huntsville, AL

This research focuses on an urban spatial phenomenon known as leapfrogging, a spatial pattern associated with the spreading edges of urban sprawl. Leapfrogging is described as a discontinuous pattern of development with patches of vacant land interspersed with more intense development. The U.S. Census Bureau has recently developed certain criteria in 2000 that may be useful in identifying discontinuities in the urban fabric. These new criteria refine the analysis of the urban edges and introduce the "jump" and "hop" methodologies for delineating Urbanized Areas (UAs). The areas not designated as being urban are classified as "gaps" that do not meet the new criteria for UAs. One requirement for inclusion in the UA is that census blocks reach a certain density threshold. Previous research has used density as important factor concerning the continuity of UAs. The continuity dimension introduced by Galster et al. (2001) is concerned with density only as a way of determining whether tracts of land contain enough housing units to consider it part of a continuous UA or a skipped over area. Research investigates the possibilities of these new census criteria, offering insight into their application as tools to identify and measure the leapfrogging phenomenon.

ZONING-WHAT HAPPENS IN ITS ABSENCE: A MADISON COUNTY ALABAMA HIGHWAY SEGMENT.

William K. McAllister, Dept. of Community Planning and Urban Studies, Alabama A & M University, Huntsville, Alabama

A location that never had zoning but is experience consistent urban development is a good place to examine land use conflicts that planners claim may encompass health, safety, and general welfare problems. A micro-assessment of one mile of Alabama Highway 53 shows a broad range of uses developing over the last ten or more years, including a home, large metal buildings, mini-storage, several nighttime activities, a church, an eatery, a manufacturing firm, and many small shops. All uses are located outside of the zoning process of the city of Huntsville, but not far from its boundary to the east and south of the subject site. Travel on this highway mainly consists of trips between Huntsville and Nashville, work trips between residences in Tennessee and the Huntsville metropolitan area, as well as an increasing traffic load from new residential subdivisions in the expanding urban-rural fringe. This straight two-lane facility carries over 14,000 trips in a typical 24-hour day. While potentially conflicting uses are seemingly co-existing, vehicular turning movements into and from uses adjacent to the highway are increasingly tricky and dangerous. Highway 53 between Huntsville and the Tennessee border is planned for four and five lanes and right-of-way purchase is beginning. Will a major increase in highway capacity and associated safety improvements solve most of the current problems without a formal program of planning and zoning?

CREATING VIABLE PLANS FOR PROPERTY DEVELOPMENT: DEVELOPMENT SCHEMES FOR THE BURTON PROPERTY.

Patrice S. Ruffin, Dept. of Community Planning and Urban Studies, Ala. A&M Univ., Normal, AL 35762.

There is documented evidence that Black landowners have and continue to lose lands throughout the state of Alabama. Many times this loss is due to heir property entanglements and the lack of someone stepping forward to develop some plan for the preservation and use of the property. A property owner with land holdings in Chilton County, Alabama requested technical assistance from the School of Agricultural and Environmental Sciences to help her family and herself in their quest to keep their property and put it to valuable use. The key premise supporting this effort was that this project presented an excellent opportunity for students of the Department of Community Planning and Urban Studies to gain first hand experience in the development process through visioning exercises and charrette preparation. The purpose of the project was to provide the technical assistance requested by the property owners, which included mapping, surrounding land use analysis, and the proposal of a set of alternatives for property development schemes. With the challenges faced by the family in mind and an understanding of some of the desires of the property owners, the group was able to come up with a development scheme for the Burton Property. The scheme suggested that the property be divided into three sectors, one for residential uses, one for recreational development, and one for agricultural and research uses.

LANDSCAPE SCALE FOREST CLASSIFICATION IN THE PINE MOUNTAIN RANGE, GEORGIA.

Robert Carter, Department of Biology, Jacksonville State University, Jacksonville, AL 36265. Andrew Londo, Department of Forestry, Mississippi State University, MS 39762.

The Pine Mountain Range in the Piedmont of West Central Georgia, USA has remnant longleaf pine ecosystems that occupy steep slopes with shallow soils. The montane longleaf ecosystems contain an unusual species composition of coastal plain (*Quercus margaretta*) and Appalachian (*Vaccinium pallidum*) species. Landscape scale analysis of ecosystems through ordination and cluster analysis revealed four major ecosystems influenced by topography and fire history. This research was supported by a Faculty Research Grant from Jacksonville State University.

AN EVALUATION OF THE REDEVLEOPMENT OF PINHOOK CREEK, HUNTSVILLE, AL.

Penny Koger-Thomas and William K. McAllister, Dept. of Community Planning and Urban Studies, Alabama A & M Univ., Huntsville, AL.

Flooding in the downtown area of Huntsville, Alabama has been a major concern for city officials and citizens for numerous years. The instant aftermath of the treacherous floods often leaves the city surrounded by water for hours and even several days. Due to floodway concerns, the affect of future flooding leaves the city economically unappealing to businesses. For years, and most recently in May of 2003, the city's flooding problems were and still are sourced by Pinhook Creek, a tributary of the Huntsville Spring Branch, which flows to the Tennessee River. The creek's history of rising waters is making officials seek viable solutions. Over forty buildings and streets are located within the Huntsville floodway, where no buildings are permitted. The researcher is evaluating the measures the city is undertaking to diffuse Pinhook Creek's uncertainty and to attract businesses for the comprehensive development of downtown Huntsville.

PHYSICS AND MATHEMATICS

SOME EXTREMAL FAMILIES OF EDGE-REGULAR GRAPHS.

Kenneth Roblee, Dept. of Mathematics and Physics, Troy State Univ., Troy, AL 36082. Tom Smotzer, Dept. of Mathematics and Statistics, Youngstown State Univ., Youngstown, OH 44555.

We build on previous results concerning regular simple graphs in which there exists a $t > 0$ such that any two adjacent vertices have exactly t common neighbors, and the union of their neighborhoods includes all but exactly p vertices. It has been determined that the maximum number of vertices on such a graph given such a t and p is $3t+3p$, and that the graphs having this number of vertices are unique when $t > 2p$. In this talk, we examine graphs having the requirements above with order $n < 3t + 3p$; in particular, we characterize such graphs of order $n = 3t + 3p - 2$, with the additional requirement that common-neighbor sets of adjacent vertex-pairs induce a perfect matching (so that t is even). We further consider whether there are any such graphs in the case where t is odd and the common-neighbor sets of adjacent vertices are near-perfect matchings.

THE SOLAR OBSERVATION PROGRAM AT SAMFORD UNIVERSITY.

Henry W. Glotfelty, Department of Physics, Samford University, Birmingham, AL 35229.

The Department of Physics has acquired a 12" Meade LX200GPS telescope and a Santa Barbara Instrument Group CCD Camera, the SBIG ST-8E. In addition, the Department has purchased three solar filters: a Thousand Oaks Optical Type 2 Plus Filter for the 12" Meade, a Thousand Oaks Optical Hydrogen Alpha Filter for the 12" Meade, and a Thousand Oaks Optical Type 2 Plus for our Celestron 5. Our goal in our solar observation program is two-fold. We are planning to have an active, undergraduate program in observing and studying the properties of sun, especially sunspots. Secondly, we will have an outreach program. The general public and non-physics majors will be invited to observe the Sun at special times. It can truly be said that our Sun is a fascinating star to observe.

OPTICAL TWEEZERS: CONSTRUCTION OF A SINGLE-BEAM OPTICAL TRAP FOR MANIPULATING MICRON-SIZED OBJECTS.

D. Brian Thompson, Trevor Steinke, and Anthony P. Blose, Dept of Physics and Earth Science, Univ. Of North Ala., Florence, AL 35632.

A single-beam gradient-force optical trap, called an *optical tweezers*, uses a microscope objective lens to focus a single beam of laser light. The focused beam of light can be used to attract and trap micron-sized particles, allowing one to manipulate these particles. Thus, the optical tweezers is a powerful tool for both biological and physical studies of microscopic particles. We describe an optical tweezers that we built from commercially available components. In terms of cost, safety, and research potential, this apparatus is well-suited for undergraduate physics research. One hallmark of our optical tweezers is its flexible design, and so we also describe plans for future modifications to expand its capabilities.

ESTIMATING THE ECCENTRICITY OF THE EARTH'S ORBIT FROM THE DATES OF THE EQUINOXES, SOLSTICES AND APSIDES.

A. Tan, Department of Physics, Alabama A & M University, Normal, AL 35762.

The perihelion of the Earth's orbit occurs only 13 days after the Winter Solstice. This accidental closeness furnishes us with two methods for estimating the eccentricity of the Earth's orbit. Method A utilizes the dates of the equinoxes, whereas Method B uses the dates of the Solstices and Apsides. The procedure for Method A is as follows: (1) find the interval from the Autumnal Equinox to the Vernal Equinox; (2) the planet's period of revolution; (3) evaluate the interval from the perihelion to the first crossing of the latus rectum; (4) evaluate the interval from the perihelion to the aphelion; (5) set the ratio of (1) to (2) equal to the ratio of (3) to (4); and finally, (6) solve the resulting transcendental equation graphically to yield the eccentricity. Method B equates the areal velocities at the apsidal points. Method A slightly underestimates the eccentricity, whereas Method B slightly overestimates it.

INDUSTRY AND ECONOMICS

WIRELESS STANDARDS AND REGULATIONS.

Paulette S. Alexander, Dept. of Computer Information Systems, Univ. of North Ala., Florence AL 35632.

Wireless technologies have experienced tremendous change related to both voice communications and data communications during the last decade. The astonishing proliferation of services such as paging and cellular telephone has created a paradigm shift in the ways that people stay connected to work, friends, and family. Traditional landline local and long distance telephone companies are experiencing encroachment into their markets because of changes in technology, standards, and user expectations. A proliferation of data communications applications has also developed utilizing Internet-related technologies and a host of personal devices intended to allow individuals to carry data to or access data at fixed and variable locations. Current technology allows wireless data communication for a variety of Internet business and personal applications. Evolution patterns of standards (and then regulations) in wireline voice services provides a framework for considering the pattern of evolution for wireless voice services. Concurrently, using Internet technologies has presented challenges related to both the technology and user expectations. The confluence of wireless and Internet technologies foretells an even more dramatic paradigm shift: the movement of voice communications and data communications applications to the same wireless Internet service provider, utilizing a broad range of terminal devices. Standards and regulations must continue to address the issues of service availability, reliability, security, service quality, privacy, cost, ease of use, and manageability. Decision makers must apply lessons learned from the past experiences in evaluating, deploying, standardizing, and regulating these technologies and their applications.

EFFECTS OF OFFSHORE OUTSOURCING OF IT JOBS.

William A. Hailey, Dept. of Computer Information Systems, Univ. of North Ala., Florence, AL 35632.

Outsourcing -- essentially hiring someone or an organization to do functions that typically would have been done in-house. The practice is debatable, with many arguments being presented to justify or argue against it. Economist typically use Ricardo's Theory of Comparative Advantage (1817) to justify outsourcing. Labor becomes protectionist and wants to keep the high-paying jobs. Some see it as a threat to the standard of living for many middle class workers. In this year's Presidential Election, outsourcing may become the most important issue in the minds of the electorate in deciding which candidate will win. For computer professionals and educators, the concept is defining their future work. Off-shore outsourcing has been experienced by U. S. manufacturing, but the practice occurred slower and the American response was easier to implement. If the current growth in off-shore outsourcing continues, the American IT worker will either have to adjust or be unemployed. This paper looks at the developments and trends and identifies possible responses for both IT professionals and educators.

DUDE, WHERE'S MY SURPLUS?

James G. Alexander, Marsha D. Griffin, Alabama A&M Univ., Normal AL, and Linda A. Carr, Univ. of West Alabama, Livingston AL.

The multiplicity of interactive variables slinked by complex relationships makes social science analysis difficult and subject to substantial errors. Limited ability to isolate variables and examine their connections by means of experimentation adds to the problem, as do the existence of lags and the importance of expectations. Economics, like its sister social sciences, is "difficult" even if often not classified as "hard." This does not, however, render it meaningless or a mere matter of opinion. It is against this background that the present research addresses the issue of the dramatic turnaround in the federal budget position over the past few years. The premise is not that this transformation is devastating to the economy, nor is it assumed that the movement from surplus to deficit is inherently desirable. Rather, it is contended that economic analysis is capable of usefully informing scholars, policy makers, and the public on the issue. Moreover, while humility is an appropriate by-product of science, failure to speak truth to power is an abdication of responsibility by scientists.

Doing Business Post Enron,

Keith Absher, Department of Management and Marketing, Univ. of North Ala. Florence, AL 35632. Walton Padelford and Tom Proctor, Department of Business Administration, Union University, Jackson, TN 38305.

The list of companies inflating the balance sheet, lying about profits, or misleading customers and stockholders in some other way is growing rapidly. The misbehavior of a small number of rogue executives, analysts and bankers has made life much harder for the majority who are honest, hardworking and eager to enrich their shareholders, employees, customers and communities. Some of the impacts include: Increased regulations on public firms; Sarbanes-Oxley corporate-reform act ; Tougher regulation of auditors through a new accounting oversight board; New and tougher rules in Great Britain; Increased regulations on private firms; and Malpractice worriers on the rise. The things that went wrong with the companies facing scrutiny and, in some cases, criminal charges were not borderline interpretations of rules. Enron and other corporate executives fabricated or grossly misstated company profits, kept the stock artificially high, and engaged in other questionable or illegal accounting practices in the name of corporate pride and greed. The task now facing corporations is how to rebuild trust in the investment community. Hardened by three years of falling stock prices and regular revelations of corporate wrongdoing, consumers have become jaded about governance issues and accounting failures. What executives need now is a way to rethink their businesses that will inspire people and revive investment confidence.

10 FACTORS TO CONSIDER WHEN MARKETING TO GENERATION Y.

Keith Absher, Department of Management and Marketing, Univ. of North Ala. Florence, AL 35632. Darin White and Jenny Cowell, Department of Business Administration, Union University, Jackson, TN 38305.

The Generation Y population, born between 1979 and 1994, is three times the size of Generation X and includes some 68 million Americans. As the second largest generation next to the Baby Boomer, they have caused a tidal wave in trends, consumption, markets and profits. In general, researchers characterize this generation as a less homogeneous market. There is a great deal of racial and ethnic diversity, with one in three not being Caucasian. They are very techno-savvy, being more comfortable even than Generation X with technology. The Internet is their medium of choice; thus a well-designed Web site is crucial for any company hoping to reach them. They respond to advertisements differently, attracted to messages that use humor, irony, unpretentious messages, and unvarnished truth. Stores designed for Gen Y exude high energy, with lots of fast-moving visual stimuli, splashy graphics, brilliant colors, and interactive activities. Bombarded by information, Generation Y is not easily hyped. They are difficult to shock and do not have the patience for a hard sell. They are highly self-reliant, with more than one-third working as much as 20 hours a week. One of the most lucrative segments of the U.S. population, their average expenditures exceed $136,000,000,000 annually. With this kind of consumer impact, it is not surprising to find a high level of interest in the factors that influence their buying decisions.

SCIENCE EDUCATION

FUTURE FACULTY EXPERIENCING THE REALITIES OF TEACHING IN GENERAL CHEMISTRY.

Joe L. March and Larry K. Krannich, Dept. of Chemistry, Univ. of Ala. at Birmingham, Birmingham, AL 35294-1240.

A program has been designed and implemented to help future faculty members understand the many different teaching responsibilities encountered by tenure-track faculty in a typical Research I university. This program has provided graduate students from basic science Ph.D. programs with representative academic department experiences in three key areas: classroom teaching, supervision of teaching assistants, and classroom materials preparation. We will present our approach, using general chemistry as the teaching experience venue, and discuss ongoing assessment/feedback tools.

USING A VIRTUAL LAB TO MODEL PROBABILITY DISTRIBUTIONS.

Jan Case, Department of Mathematical, Computing, and Information Sciences, Jacksonville State University, Jacksonville, AL 36265.

In recent years, there has been a tremendous amount of development of web-based software that is free and easy to use. One example of such a site is the Virtual Laboratory in Probability and Statistics developed by Kyle Siegrist at the University of Alabama at Huntsville (www.math.uah.edu/stat/). The virtual lab makes use of "applets" which are small self-contained programs that run in web pages. The lab offers students the opportunity to rapidly complete numerous examples and recognize the patterns inherent in the processes. In a virtual lab, a given procedure can be replicated thousands of times in a matter of seconds with the output displayed in customized tables and graphs. This process encourages the development of pattern recognition at a level that is difficult to accomplish with only a small number of examples such as a textbook homework assignment might involve. Greater understanding of the underlying patterns should enhance student performance in both application and interpretation of concepts. This paper focuses on a simulation that is used to model the capture-recapture problem through the use of the hypergeometric probability distribution.

NEW APPROACHES TO NUTRITIONAL SUPPLEMENT THERAPIES INSTRUCTION,

Norman J. Doorenbos, Department of Pharmacal Sciences, Harrison School of Pharmacy, Auburn University, Auburn, AL 36849.

The Dietary Supplement Health and Education Act of 1994 ushered in a new era for natural medicines. The growth of interest and utilization of herbal drugs and other nutritional supplements has been explosive. Nutritional supplements include plant, animal, microbiologic and mineral products. Such pharmaceutical substances had been included in pharmacognosy, a subject last taught at Auburn University 30 years ago.

Nutritional Supplement Therapies was introduced as an elective six years ago. It attracts high achieving future pharmacists wishing to extend their knowledge base to incorporate these safe, inexpensive and often very effective natural medicines.

The inclusion of samples of natural medicines, tidbits, stories, case histories, key point lists, enthusiastic classroom discussions and student presentations heighten the popularity of this elective. Each student prepares a monograph of thirty or more nutritional supplements as the final examination. Examples of course features will be shared. Copies of the syllabus/schedule and course features will be provided as handouts.

STRENGTHENING THE MINORITY PIPELINE IN THE BIOMEDICAL SCIENCES.

Velma B. Richardson and Helen H. Benford, Department of Biology, Tuskegee University, Tuskegee, Ala 36088.

ENHANCES is a Tuskegee University initiative in biology and related sciences funded by the Howard Hughes Medical Institute with the goal of expanding the number of women and underrepresented minorities who pursue graduate study and research careers in the biomedical sciences. Selected prefreshmen attend a summer residential program and embark on a science pathway that includes college courses in English and mathematics as well as scientific thinking and research preparedness activities. During the following fall semester, participants enroll in appropriate freshman-level courses plus an honors Cell and Genetic Biology laboratory. ENHANCES upperclassmen indicate that these program activities are especially helpful in developing the ability to think critically and to approach confidently mid-level course assignments and summer research training. Research experience is emphasized and ENHANCES participants receive assistance in identifying summer research opportunities beginning in the post-freshman summer. ENHANCES is designed to promote early intervention, academic success and student retention in the science pipeline. An element central to student success is the creation of an environment where faculty have positive expectations and are actively engaged in the mentoring process. Also key is the development of effective peer support systems that foster self-esteem and self-confidence. More than 220 students have participated in ENHANCES since its inception; significant numbers have graduated with distinction and pursued graduate and professional programs of study.

SCIENCE EDUCATION OUTREACH IN BIRMINGHAM METROPOLITAN AREA IMPACTED BY THE NSF GK-12 PROGRAM.

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Through our current NSF GK-12 program, graduate fellows and advanced undergraduates serve as highly effective resources for SMET content and applications in K-12 education while gaining valuable experience in communicating scientific knowledge and inquiry-based learning to diverse learners through targeted, scientific outreach programs in the Birmingham metropolitan area. We hope to create first-hand awareness in graduate fellows of why and how scientific professionals can serve as effective stakeholders in improving K-12 science education in the community. Fellows are incorporated into the teaching, curriculum development, hands-on science lab instruction, and mentoring activities in a number of ongoing alliance programs that have proven to be popular and highly effective with K-12 students and teachers in the Birmingham City and the Jefferson County school systems. K-12 teachers receive professional development in the outreach programs through workshops and directly mentor the fellows in classroom teaching. The specific roles of fellows and teachers, nature of the UAB/public school partnership, scope of the outreach programs, and impact of the UAB GK-12 program will be discussed.

BEHAVIORAL AND SOCIAL SCIENCES

ASSESSING THE NEED FOR A CAMPUS CONFLICT RESOLUTION OR MEDIATION SERVICE: A PRELIMINARY ANALYSIS OF SURVEY RESULTS FROM AUBURN UNIVERSITY MONTGOMERY.

Cheryl K. Bullard and Gloria J. McPherson, Dept. of Justice & Public Safety, Auburn University Montgomery, Montgomery, AL 36124.

Conflict Resolution and Alternative Dispute Resolution (ADR) refer to the settling of disputes outside of the courtroom. As more states and the federal government began implementing ADR programs, there emerged a trend in higher education to experiment with conflict resolution. According to a recent survey, more than 200 colleges and universities have implemented campus conflict resolution programs. Most of the programs offer one or more forms of mediation for disputes among students, disputes between students and faculty, disputes among faculty, and disputes between staff and administrators. Auburn University Montgomery (AUM) recently conducted a study, partially funded by a grant from the AUM Research Grant-in-Aid Program, in which three separate needs assessment tools (scenario questionnaire, "hot spot map," and conflict matrix) were utilized to assess the need for a campus conflict resolution or mediation service. The sample selected for this study represents about 5% of AUM full-time employees, specifically 26 AUM administrators, faculty, and staff. Preliminary results indicate that the majority of conflict issues or grievances are directed to Deans and Department Heads. The perceived areas of frequent or intense conflict occur in parking lots and residential housing. The classroom also was perceived to be an area that sees more than a normal level of conflict.

ROAD RAGE BEHIND THE WHEEL: A CORRELATIVE STUDY OF PERSONALITY AND DRIVING CHARACTERISTICS.

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Originating in the US, the term "road rage" can refer to any display of aggression exhibited by a driver including more extreme acts of aggression such as physical assault. In today's society, "road rage" has become a common expression used to describe a wide spectrum of behaviors including physical or verbal assault or even, in some instances, murder. The current researchers speculate that when combined with specific cues, such as color and type of car, aggressive and competitive tendencies may erupt in road rage. Previous research has not focused specifically on the color and type of car but on the differences of how individuals express aggression. Volunteer students were asked to complete a packet of questionnaires including measures for aggression and competitiveness as well as a researcher-created driving questionnaire and a life goals questionnaire. The packet included a self-esteem measure, which acted as a distractor task. Suggestions for future research and possible applications are discussed.

THE RELATIONSHIP BETWEEN POVERTY AND ACHIEVEMENT IN ALABAMA PUBLIC SCHOOL STUDENTS.

Donna Hendrix, Jacksonville State University. Research advisor, Jan Case, Department of Mathematical, Computing, and Information Sciences, Jacksonville State University, Jacksonville, AL 36265.

This paper examines data provided by the Alabama Department of Education to model the relationship between poverty and achievement. Poverty is defined in terms of the percentage of students who participate in the free lunch program, and achievement is measured by SAT scores. All 128 Alabama public school systems were included in the study, and the data is from the 2001-2002 school year. Overall, the average percentage of students who participate in the free lunch program is 51.4% with individual systems ranging from 0% to 100%. The average SAT score is a percentile rank of 54.4 with individual systems ranging from 33 to 89. A linear regression analysis was performed to create a model. The analysis revealed an inverse relationship with a correlation of -.88 between the variables. The equation of the regression line is SAT = 78.6 - .47(Free lunch%). The relationship is significant at $p < .001$. The conclusion that SAT scores decrease as poverty level increases is not surprising, but the creation of a model to predict the effect of poverty on SAT scores is informative.

CONFLICT MANAGEMENT ON THE UNIVERSITY CAMPUS: AN INVENTORY OF CONFLICT STYLES.

Cheryl K. Bullard and Gloria J. McPherson, Dept. of Justice & Public Safety, Auburn University Montgomery, Montgomery, AL 36124.

The purpose of this study was to determine the conflict styles of a sample of the student population at Auburn University Montgomery. Participants included both undergraduate and graduate students (N=349). The sample selected for this study represented approximately 5% of the student body. Participants completed the Conflict Management Inventory (Goldstein, 1999), a standardized personality measure designed to evaluate different styles and emotions students exhibit during conflict situations and perceived conflict situations. The CMI is composed of five factors with fifteen items each. The current study investigated student CMI scores as a function of age, gender and race. Results indicated that the CMI was moderately reliable. Reliability coefficients (α) for the CMI five factors are as follows: Confrontation = .66, Emotional Expression = .81, Public/Private Behavior = .85, Conflict Avoidance = .78, Self Disclosure = .67, and entire scale = .85. Traditional students (ages 18-24) reported being more confrontational, more emotionally expressive, more likely to display conflict behavior, less likely to avoid conflict and more self-disclosing about grievances than were non-traditional students (ages 25-65). Gender differences also emerged with women being more emotionally expressive and self-disclosing about conflict situations than were men. Men were less likely to avoid conflict than were women. Partially supported by a grant from the AUM Research Grant-in-Aid Program.

REVISING THE COMPUTER HASSLES SCALE USING AN INTERNET BASED QUESTIONNAIRE.

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The Computer Hassles Scale was developed to measure stress that results from human-computer interactions (HCI). A type of stressor produced from HCI was called a "computer hassle." The Computer Hassles Scale (Hudiburg, 1995), a measure of computer-related stress, was composed of 37 items that reflected the common experiences people had using computers during the 1980s and 1990s. Many of the "hassles" reported are still relevant to computer use but much of the computer use during the 21st Century encompasses the Internet. The current research sought to revise the Computer Hassles Scale by including Internet based computer hassles. This research was conducted using an Internet based research questionnaire (Hudiburg, 2003). A revised Computer Hassles Scale was part of an on-line questionnaire which included measures of global stress and reactivity. Two separate data captures were conducted during 2003 and 2004. The first data capture yielded 200 usable questionnaires and the second data capture yielded 330 usable questionnaires. The most frequent computer hassles were reported for both samples. There were significant correlations between the 71-item revised Computer Hassles Scale and self-reported somatic complaints in both samples ($r = .39$ and $r = .26$). In both samples the revised Computer Hassles Scale was significant correlated with a global measure of stress ($r = .21$ and $r = .16$). An inconsistent finding was the correlations between the revised Computer Hassles Scale and measure of reactivity (Kohn, 1985) in the two samples ($r = .15$ and $r = .03$). Suggestions for further research with the revised Computer Hassles Scale were offered.

INTENSITY OF EXERCISE AND FUNCTIONAL DISABILITY AMONG OLDER ADULTS WITH ARTHRITIS.

Nadine T. James, and Kathleen C. Brown, School of Nursing, Univ. Of Ala., Birmingham, AL 35294. Carl W. Miller, U. S. Navy (Retired), Kiln, MS 39556.

Objective: The primary objective of the current study was to examine exercise behavior among older adults with arthritis. Specifically, answers to two research questions were sought: (a) does intensity of exercise predict functional disability and (b) do certain host and psychosocial factors predict exercise behavior? **Method:** Data were obtained from the 1995 survey of Aging, Status, and the Sense of Control (ASOC) that used a telephone probability sample of 2,592 American households. The ASOC was funded by a grant from the National Institute on Aging (RO1-AG12393). Sampling, pretesting, and interviewing in support of the survey were conducted by the Survey Research Laboratory of the University of Illinois. The ASOC survey data -were made available through the Inter-University Consortium for Political and Social Research (Mirowsky & Ross, 2001). **Results**: Six independently significant predictors were identified through regression analyses: overall health ($p=.005$), comorbidity ($p=.024$), depression ($p=.043$), activities of daily living (ADL) limitations ($p=.020$), age ($p=.020$), and employment status ($p=.013$). **Conclusions:** Older adults with arthritis who exercised (at any intensity) reported less functional disability than non-exercisers. Participants with poorer health states, more illnesses, symptoms of depression, and greater ADL limitations tended to exercise less. Additionally, those who were older and those who were unemployed were less likely to exercise.

A COMPARISON OF THE ACADEMIC PERFORMANCE OF TRADITIONAL UNIVERSITY STUDENTS AND STUDENTS WITH CHILDREN. Leslie Bice and Patricia Rodriguez, Jacksonville State University. Research advisor, Jan Case, Department of Mathematical, Computing, and Information Sciences, Jacksonville State University, Jacksonville, AL 36265.

This paper summarizes the results of a statistical study undertaken on the campus of Jacksonville State University. One hundred students were surveyed and data was collected concerning enrollment status, marital status, whether the students had children or not. The various categories of students were examined statistically in terms of grade point average. The data was summarized graphically and a two-population hypothesis test for difference in means was conducted. The study revealed that marriage did not impact grade point average, but parenthood did. Those students who were parents had an average grade point average of 3.229 while those students without children had an average grade point average of 3.054. These results are significant with $p = .071$.

DETERMINANTS OF EMPOWERMENT AMONG USERS OF MICROFINANCE IN UGANDA: THE CASE OF RURAL WOMEN FARMERS. **Florence Wakoko, Department of Psychology & Sociology, Columbus State. Univ., Columbus, GA 31907**

Rural farmers in Uganda have become increasingly interested in microfinancial resources MFRs (informal credit and savings), that are being promoted nationally as important means for poverty alleviation and women's empowerment. A growing body of literature suggests that MFRs alone are not adequate indicators of women's empowerment and, women's decision-making power is likely to be highest where their inputs to household survival is high relative to men. Based on a survey of 527 Ugandan farmers, this paper explores factors affecting their use of MFRs, and the extent to which these factors and MFRs determine women's relative role in decision-making power over agricultural production and income use.

SIN SICKNESS: GUILT, SHAME AND THE AMERICAN PSYCHE. Rhonda L. Grissom, Department of Psychology, Walden University, Bloomington, IN 47405.

Can sin make us physically sick? Some sins, such as overeating and adultery, have obvious serious physical ramifications such as obesity and risk of exposure to sexually transmitted diseases. However, other sins can influence our psychological state through guilt and shame, which under serious circumstances can lead to stress. Stress, in turn can lead to sickness. This paper explores the link between sin and sickness, as well as how the hidden belief in sin sickness may influence our perception of others and ourselves.

HEALTH SCIENCES

OCCUPATIONAL STRESS AND QUALITY OF CARE: NURSES PERSEPTIONS IN THE NEUROLOGICAL INTENSIVE CARE AND STEP-DOWN UNITS.

Elizabeth Mosley, Dept. of Nursing, Uni. of Ala., Birmingham, AL 35294.

There is no existing research that consistently reports an intensive care unit is more stressful to the nurse than a regular unit. There is, however, research that shows the negative effect occupational stress can have on the quality of care a patient receives. The purpose of this study was to analyze the nurse's perceptions of these two factors and to compare data between two units of one hospital in the southeastern United States. Questionnaires analyzing occupational stress (Cohen, et al., 2002) and perceived quality of care (Stafford, et al., 1978) were completed by participants who were registered nurses working on the Neurological Intensive Care and Step-down units. Thirty-one questionnaires were collected from both floors (n=31, 36% response rate). The reliability (Cronbach's alpha) of both scales was very high with the occupational stress questionnaire score and the quality of care questionnaire score of .92 and .94 respectively. No difference was found in stress level or perceived quality of care between the units. There was, however, a significant negative correlation found between stress and perceived quality of care ($r = -.61$, $p < .01$). Implications for practice include the importance of reducing stress in order to increase quality of care.

WRITING TO LEARN: IN SEARCH OF SELF.

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In a master's level nursing administration clinical preceptorship, writing to learn becomes a journey in search of self-discovery for the students. Writing is unfamiliar to many students. The writing process is incorporated into self-evaluation tools of discovery and intention statements, clinical learning logs, and feedback strategies that foster students' self-esteem. The purpose of feedback as a strategy is explored in depth. Chacon's (2003) preliminary findings on the use of Parallel Charts for third-year medical students support the premise that writing to learn fosters self-assessment, self-evaluation, and thereby greater effectiveness in interacting with patients in the health care environment. Future strategies include (1) Incorporating a Buzan (1974) diagram as the initial action in students' organizing interrelationships; (2) Involving students in creating evaluation criteria for the clinical learning log; and (3) Videotaping students' presenting their clinical learning logs at scheduled intervals. The videotapes, used to guide and track student's journeys, will be examined as a strategy for behavioral change. Teaching via the writing to learn process will enable students and instructors to assess themselves without outside observers.

APPLICATION OF THE CORRELATION COEFFICIENT IN A METHOD COMPARISON STUDY.

Brent B. Barnes, Tryan Atkins, Virginia C. Hughes, Division of Clinical Laboratory Sciences, Dept. of Biology, Auburn University Montgomery, Montgomery, AL, 36124.

A method comparison study was performed by two students enrolled in the Clinical Hematology III course at Auburn University Montgomery. This study utilized two hematology analyzers, the Cell-DYN 1600 (Abbott Laboratories) and Serono 9018 (Serono Diagnostics). Whole blood was collected from fellow medical technology students on a weekly basis by venipuncture and placed into 5-mL vacutainer tubes containing the anticoagulant ethylenediaminetetracetic acid (EDTA). A total of 20 samples were collected and analyzed for hemoglobin determination using cyanmethemoglobin methodology. The correlation coefficient, r, was calculated and results were consistent with positive correlation between the two hematology analyzers. The correlation coefficient is a useful parameter for method comparison studies involving hemoglobin determination. Studies like this one should be incorporated into clinical laboratory science/ Medical Technology courses to help better prepare students for instrument method comparison in clinical laboratory management.

ASSESSING SOCIAL SUPPORT AND THE RISK FOR POSTPARTUM DEPRESSION.

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Previous studies have suggested that social support may be a significant factor in postpartum adjustment. These studies have not examined the relationship between social support and the risk for postpartum depression using instruments specifically designed for the postpartum period. The purpose of this study was to examine the relationship between social support and the risk for postpartum depression using the *Postpartum Support Questionnaire (PSQ)* (Logsdon, 1994) and the *Postpartum Depression Screening Scale (PDSS)* (Beck & Gable, 2002). The *PSQ* allows for the assessment of a mother's desired or valued support and her perceived or actual support. The primary hypothesis was that the discrepancy between a mother's desired support and her actual support (support discrepancy score) will be significantly correlated to the mother's risk for postpartum depression. Postpartum women were requested to complete the *PSQ* and *PDSS*. Preliminary findings (n=12) indicate a significant relationship between the support discrepancy score and the risk score for postpartum depression ($r = -.75$; $p < .01$). The greater the negative discrepancy between a mother's desired or valued support and her perceived or actual support, the greater her risk for postpartum depression. The implications of this finding for nursing practice are explored.

PREVALENCE OF SARCOPENIA AND EFFECTS OF EXERCISE ON MUSCLE WASTING IN HIV+ INDIVIDUALS TAKING HAART: A SECONDARY ANALYSIS.

Adam B. Lansdon (Barbara Smith) University of Alabama School of Nursing, University of Alabama at Birmingham, Birmingham, AL 35294-1210.

HIV has emerged as one of the most feared and "socially tabooed" illnesses of the human race with over 40 million cases diagnosed. Since the discovery of Highly Active Anti-Retroviral Therapy (HAART) it has been possible to partially prevent the spread of HIV and potentially cure it. HIV is associated with side effects including sarcopenia or muscle wasting. Exercise has been shown to increase muscle mass. The purpose of this study was to conduct a secondary analysis of data examining how effective an aerobic/resistive exercise program was in managing muscle wasting in an HIV+ population who are on HAART. The relative skeletal muscle index (RSMI) was computed before and after completion of a 12-week program.

Twenty-nine subjects participated with a mean age of 43. Caucasian and African-American ethnicities were represented. When a formula for estimating RSMI was applied, 2 of the participants were found to be sarcopenic. At the end of the exercise program, the RSMI improved ($p<.05$). From these results, one can conclude that an exercise program, when followed adequately, can indeed improve RSMI. This provides relief for the HIV+ population who are taking HAART. This study was supported in part by a grant from BTGC Pharmaceuticals.

STREPTOCOCCUS PNEUMONIAE: FURTHER INSIGHTS INTO THE EVOLUTION OF PENICILLIN RESISTANCE.

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Streptococcus pneumoniae is a major cause of morbidity and mortality in the United States associated with bacterial pneumonia, meningitis, bacteremia and otitis media. *S. pneumoniae* can also be carried asymptomatically, although the genetic relationship to clones causing disease has not been established. Most strains of highly penicillin resistant isolates are part of clonal groups of very successful pneumococci. Because pneumococcal strains are modified rapidly by horizontal gene exchange during transformation, the detection of strains ancestral to particular clonal lineages is difficult. However, this can be addressed in the case of a well-studied clonal lineage, Clonal Complex 14 (CC14), which contains a number of recognized worldwide penicillin-resistant clones. The clone of interest, Spain^{6B}-2,sequence type (ST) 19, is one of several drug-resistant clones appearing over the past twenty years and it is often seen in Alabama and elsewhere in the US since the 1990s but older isolates have not previously been examined. Our hypothesis is that rapid spread of penicillin resistance occurring around 1990 coincided with the appearance of strains bearing both altered muropeptide structure and penicillin-resistant penicillin binding proteins. Pulsed field gel electrophoresis (PFGE) will be performed to identify strains that fall into CC14 and that pre-date development of resistance. Multi locus sequence typing (MLST) will be performed on the identified strains to determine (ST).

ELDERS' IMPRESSIONS OF ETHICOLEGAL ISSUES IN HEALTHCARE: A QUALITATIVE STUDY.

Gabriella H. Cooper and Ellen B. Buckner, University of Alabama School of Nursing, University of Alabama at Birmingham, Birmingham, AL 35294-1210

Ethicolegal issues in healthcare play a leading role in the satisfaction and comfort patients relate to hospital care. Ensuring that patients perceive their care in a positive light not only helps the hospital, but also aids geriatric patients by decreasing anxiety that may inhibit their healing. Ethicolegal issues are those topics that involve both ethical and legal principles, such as autonomy and informed consent. The issues addressed herein include advance directives, basic human needs, healthcare decision-making, and general nursing care. The purpose of this study was to investigate the perspectives of elders regarding geriatric care. Seniors ages 65 and older were interviewed with the Seniors' Perspectives Regarding Elder Care Issues (SPRECI) questionnaire to obtain qualitative responses. Eight open-ended questions developed by the investigator comprised the SPRECI. This questionnaire was reviewed for content validity by a CNS with cardiovascular and administrative experience, a faculty member with experience in geriatric nursing, a faculty member with experience in ethicolegal issues, and another with experience in research methods. Nine elders have been interviewed to date. Findings show that most elders commend hospital care as effectively provided to geriatric patients however these responses may reflect socially acceptable answers. To counter this tendency, future interviews are planned for community settings. This study was supported in part by a grant from the UAB Center for Aging.

MOTHERS' DESCRIPTIONS OF EXPERIENCES ABOUT TOUCHING THEIR PRETERM BABIES IN THE NEONATAL INTENSIVE CARE UNIT.

Stephanie R. Austell, School of Nursing, Univ. of Ala. at Birmingham, Birmingham, AL 35294.

A mother's natural desire to touch her infant may be subject to interference when the infant is high-risk and in a NICU with intimidating life support or medical technology present. The purpose of this project was to describe mothers' thoughts and perceptions about touching their preterm infants in the NICU. The sample consisted of ten mothers who had preterm infants with gestational ages of 27-32 weeks (mean of 30 weeks). Subjects participated in individual interviews with the researcher to describe their thoughts on touching their preterm infant in the NICU. Data from this qualitative study will be used to develop interventions to facilitate the positive benefits of touching for mothers with infants in the NICU. The variables were measured using content analysis of transcribed semi-structured interviews given to the study participants. Analyses of the ten transcripts in this project revealed primary themes: confidence in quality of care infants receive in NICU, fear of handling a small, high-risk infant, learning to parent, love through touch, and increased maternal-infant bonding with touch. These findings suggest that mothers of preterm infants would appreciate suggestions and guidance from nurses regarding ways in which they should touch and handle their infants.

"OUCH CAN YOU HEAR ME?" THE NURSES' EXPERIENCE WITH POSTOPERATIVE NEONATAL PAIN.

Jennifer Hill, University of Alabama at Birmingham, Birmingham, Al 35294-1210.

Neonatal pain is challenging to assess, since signs that indicate neonatal pain are subtle. Some literature about neonatal pain still suggests that the newborn cannot sense pain. The majority of neonatal intensive care units (NICU) implement some type of pain scale by which they rate neonatal postoperative pain, but usefulness varies among practitioners. The clinical question in this research study asked what do the nurses' think is the most prevalent and most important sign of neonatal pain postoperatively. Also, the study evaluated the usefulness of the CRIES scale on postoperative neonates. Participants (n=30) were RN's with 6 months experience that worked at an NICU in a children's hospital. Questionnaires were developed by the investigator and reviewed for content validity by a CNS with postoperative experience, nurse faculty with research experience, and a neonatal nurse practitioner. Results showed that changes in vital signs were both the most prevalent and the most important sign of pain listed. Other signs included facial grimace, agitation, postural changes and crying. The CRIES scale was not preferred when assessing postoperative neonates who were preterm or using ventilator-assisted breathing. All participants agreed that the neonate could feel pain, thus dispelling the myth that newborns cannot experience pain.

THE EFFECT OF ACCULTURATION ON THE KNOWLEDGE OF AND ADHERENCE TO BREST SELF-EZAMINATION (BSE) TECHNIQUE IN HISPANIC WOMEN

Patricia D. Lucas and Susan Carroll (Ellen Buckner), University of Alabama School of Nursing, University of Alabama at Birmingham, AL, 35294-1210

Breast self-examination (BSE) has important health implications for the Hispanic population. Breast cancer survival rates are much lower in Hispanic women due to advanced progression of the disease at the time of diagnosis. Previous studies found a correlation between the level of acculturation and the knowledge of and adherence to BSE. The purpose of this study was to examine the knowledge and adherence of BSE in relation to the Hispanic woman's level of acculturation. Participants included thirty-eight Hispanic women from five rural health care settings in a southeastern state. Three questionnaires were used in this study, a demographics questionnaire, Cuellar's Acculturation Rating scale (Cuellar, et al., 1999), and a modified Knowledge and Adherence to BSE questionnaire (Coe, et al., 1994). There was no correlation (r=0.11) or statistically significant relationship between acculturation and knowledge and adherence to BSE. Future research on this topic should use a larger, more diverse sample of participants.

GETTING OFF TO A GOOD START: AN ASTHMA EDUCATION INTERVENTION FOR SCHOOL AGE CHILDREN.

Stephanie Brooke Rhodes, School of Nursing, University of Alabama at Birmingham, Birmingham, AL 35294

Asthma is a chronic inflammatory disease of the airways affecting 8.6 million children, primarily those of school age. Asthma accounts for 20% of all school absences and may decrease school performance. Teaching asthmatic children about their disease can lead to a reduction in the negative asthma outcomes. The purpose of this study was to test the effect of an intervention to increase knowledge in asthmatic children about their illness, decrease absences from school due to illness, and increase school performance. The intervention for the study consisted of two educational sessions at the beginning of the school year with content from the National Heart, Lung, and Blood Institute Website including information on taking medications, using peak flow meters, carrying a rescue inhaler, avoiding triggers and seeking assistance when needed. A tip sheet was sent home to parents. Participants were children with diagnosed asthma in 4th-5th grades from one school. Findings revealed an increase in post-test scores when compared to pre-test scores in both the control and experimental group, but showed no significant decrease in absences or increase in grades. The control group will become a second experimental group in the spring. Absences and grades are in progress for the second experimental group.

BIOTERRORISM: COMMUNITY PREPARDNESS MODEL.

James A. Johnson, Ph.D., Gerald R. Ledlow, Ph.D., and Mark A. Cwiek, J.D. School of Health Sciences, Central Michigan University, Mount Pleasant, MI 48859.

The threat of bioterrorism remains constant and the fear of its potential impact does not escape any person today. Most large cities have made plans for dealing with the potential threat, yet many smaller cities and towns have not. The authors have developed a community scorecard that serves to assist in this process. It can be utilized regardless of population size or geographic locale. The assessment helps community leaders and decision makers ascertain medical and civic capacity in the event of a terrorist action. The human resource staffing, supply lines, materials needed and coordination are all addressed along with a tool to help predict the likelihood of a given community becoming a target.

A CASE STUDY: DIABETES OR NOT?

Melinda W. Lawson, College of Nursing, The University of Alabama in Huntsville, Huntsville, AL 35899

Type 2 diabetes in children has become an epidemic in our country due to poor diets and lack of exercise. Diagnostic criteria for Type 1 and Type 2 diabetes are well defined. A dilemma occurs when a child is symptomatic of diabetes and only partially meets the diagnostic criteria. A case study of a 12-year-old girl will be presented to illustrate ho2 difficult it can be to decide, diabetes or not?

THE RESULTS OF A FOURTEEN-YEAR SCOLIOISIS SCREENING PROJECT IN ALABAMA.

Tom E. Denton, Dept. of Biology, Auburn University at Montgomery, Montgomery, AL 36117

Since its inception in 1984, over two million adolescents in Alabama's public schools have been screened for scoliosis and other spinal related disorders. The screening covered 128 public school systems within 67 counties. For the year 2002, approximately 12 per 1,000 adolescents were positive for scoliosis. This occurrence is at the lower range of values reported nationally and internationally. Some counties reported a higher number of cases than others for any given screening year, but percentages averaged out to be similar when past years were included. The occurrence of scoliosis in adolescent females was almost 3 times that of adolescent males. There were fewer cases of adolescent females with scoliosis in grade 5 than in grades 6 through 9. Males numbered about the same for all grades but were much fewer in number. The number of other spinal disorders, mainly kyphosis and lordosis, numbered approximately 1 per 1,400. Here, the frequencies of cases were about the same for both males and females. There was not a significant difference between the numbers of children having scoliosis who lived in metropolitan areas of Alabama when compared with those living in rural areas.

The Expression of CD44 in Lymphangioleiomyomatosis (LAM): An Immunohistochemistry Study. Dr. Zu-Xi Yu, Dept. of Pathology, National Institutes of Health Heart, Lung, and Blood Institute (NHLBI), Bethesda, MD 20814, Brian Gibbs, Dr. Gustavo Pacheco, Dr. Joel Moss, and Michael Spencer

Lymphangioleiomyomatosis (LAM) is a rare progressive lung disease of unknown etiology that occurs exclusively in women during their reproductive and menopause years. This disorder has characterized by the proliferation of LAM cells (an abnormal smooth muscle cells, specifically stained with HMB 45antibody) that invades the tissue of the lungs, in particular pulmonary interstitium and lymph vessels. Over time, LAM cells grow into the walls of airways and form small nodules and thin wall cysts that cause several symptoms. Since LAM is considered as a slow grown cancer and LAM cells are specifically proliferated in the lung and abdominal lymphoid tissues. CD44 and its isoforms has been detected in a variety of cell types including macrophages, monocytes, epithelial cells, smooth muscle cells, fibroblasts, and erythrocytes. CD44 may play a role in the tumor cells that progress successfully through growth and metastasis as well as cell migration. Among the isoforms of CD44, particularly CD44 variant 3 and variant 6 have been assumed that they maybe expressed only in cell differentiation rather than tumor progression. To explore the expression of CD44 and its isoforms in LAM, indirect immunostaining methods were performed on 5 LAM biopsies. CD44 and its variants were detected in the LAM cells. This study demonstrated that CD44 and its isoforms were expressed in LAM. CD44 and its isoforms in LAM were located on epitheloid cells, some vascular smooth muscle cells, alveolar wall, and all LAM cell nodules. This indicates that CD44 and CD44v3, particularly CD44v6 may play an important role in the proliferation and migration of LAM cells.

CHEMOTAXONOMICAL STUDIES OF *PAPAVER BRACTEATUM* LINDLEY, Evamaria Elsa Neumaier, USDA Experiment Station, Oxford, MS 38655 and Norman J. Doorenbos, Department of Pharmacal Sciences, Harrison School of Pharmacy, Auburn University, Auburn, AL 36849.

Papaver bracteatum Lindley was investigated by us in the Economic Plant gardens and laboratories of the Department of Pharmacognosy, University of Mississippi.. Seed was obtained by one of us (NJD) from Iran. We confirmed that plants of this species are good sources of thebaine but, unlike the opium poppy, do not contain morphine or codeine. This species may be used as a source of codeine, however, because of its ease of chemical preparation from thebaine.

Details of propagation and the results of chemotaxonomic studies of this species will be shared in an illustrated presentation which will include photographs of its beautiful flowers.

DRUG-INDUCED HEPATOTOXICITY.

Ty Blackwell, 3rd Year Medical Student, UASOM-Tuscaloosa, Tuscaloosa, AL 35487. Robert E. Pieroni, Dept. of Internal Medicine, UASOM-Tuscaloosa, Tuscaloosa, AL 35487.

An elderly male with numerous medical problems had been stabilized on multiple medications, including a statin for hypercholesterolemia and amiodarone for atrial fibrillation. Routine measurement of liver function tests revealed Hepatotoxicity, which resolved after systematic drug withdrawal. All medications except amiodarone were gradually re-introduced. We shall discuss potential hepatotoxic effects of amiodarone and statins, and their interactions. The need for constant chemical monitoring of patients on multiple medications will be underscored, as will the risk factors for adverse drug reactions in general.

COMPONENTS AND COSTS OF A MULTIDISCIPLINARY CARDIOPULMONARY REHABILITATION CLINIC: A CASE ANALYSIS OF THE EFFECTS OF NURSING LEADERSHIP.

Mary Maloney, School of Nursing, University of Alabama at Birmingham, Birmingham, AL 35294-1210. Dr. Ellen Buckner.

Cholesterol accumulation in the arteries is a causative agent in cardiovascular disease but one that is amenable to change. Nurses can contribute their knowledge and skill to assist persons in cardiac rehabilitation with modifying their lifestyle for better cardiovascular health. The beneficial effects of cardiopulmonary rehabilitation may rely on the implementation of care based on nursing practice and theory. The purpose of this study was to determine the strengths and weaknesses of a multidisciplinary nurse run cardiopulmonary rehabilitation clinic by conducting a descriptive, case analysis study including cost-effectiveness of the program. Data were collected from clinical personnel through surveys using investigator-designed instruments followed by an interview with the clinic's manager. Questions included content on clinical background, utilizing nursing theory, and cost-effectiveness strategies. Two nurse educators reviewed questions for content validity with expertise in cardiovascular care and research methods. Findings were that the clinic's manager in collaboration with an academic cardiovascular center grant founded the nurse-run clinic. The clinic's mission is to meet the core components of cardiac rehabilitation identified by the American Heart Association. It is well received by physicians but needs increased utilization through referral. The clinic's value is in its structural format with multidisciplinary team involvement.

A NEW LOOK AT IRRITABLE BOWEL SYNDROME AND A PROPOSED TREATMENT PLAN. Carol A. Leitner, J.A. Dias and Keith L. Roberts, University of Alabama at Birmingham

Irritable Bowel Syndrome (IBS) is a chronic and episodic illness characterized by altered bowel habits and associated abdominal pain. Considered a functional disease caused by abnormal motility of the gut and abnormal pain perception, traditional treatments aimed at relieving the symptoms of altered bowel habits with bulk forming additives, antidiarrheal medicines, and laxatives have been largely unsuccessful. This study proposes an individualized treatment plan based on the known physiology of gut motility, recognized neurotransmitters of pain perception, and associated psychiatric profiles of constipation-and diarrhea-predominant IBS patients.

In our clinical practice, patients with constipation-predominant IBS display a psychiatric profile consistent with anterior cingulate gyrus hyperactivity (overfocus and cognitive inflexibility). Anterior cingulate gyrus overactivity causes water retention and decreased gut motility leading to constipation, but is ameliorated by selective serotonin reuptake inhibitors. In contrast, patients with diarrhea-predominant IBS display a psychiatric profile consistent with overactivity of the limbic system of the brain (excessive worry and depression) including the hypothalamus where initiation of the autonomic nervous system takes place. Tricyclic antidepressants suppress the firing of autonomic nervous impulses from the hypothalamus, lessening diarrhea and promoting GI tract stability. Pain from the GI tract is mediated through the autonomic nervous system which contains GABA receptors (the primary inhibitory neurotransmitter of the brain). For this reason GABA-mimic drugs such as Gabapentin can mute pain perception in IBS patients. Finally, some IBS patients demonstrate increased immune response through mast cell proliferation in the small bowel which can be suppressed by appropriate anti-inflammatory agents.

ASTHMA RESOLUTION AFTER DISCONTINUING HORMONE REPLACEMENT THERAPY. Robert E. Pieroni, Dept. of Internal Medicine, UASOM-Tuscaloosa, Tuscaloosa, AL 35487. Dorothy Pieroni, Tuscaloosa, AL 35406.

A 62 year old female developed asthmatic symptoms during her menopause for which hormonal replacement therapy (HRT) had been prescribed several decades previously. She required daily inhalations of beta-agonists and steroids, and occasional rescue medications during asthma exacerbations. Two years ago, she discontinued HRT because of fear of complications, and coincidentally stopped asthma medication because of thrush. Surprisingly, her asthma became completely asymptomatic and has remained so to date. Her pulmonary function tests have also normalized. Her case will be discussed in light of the recent Nurses' Health Study suggesting an association between HRT and asthma.

PARENTAL KNOWLEDGE OF OTITIS MEDIA: A SURVEY OF PARENTS IN A RURAL ALABAMA COMMUNITY.

Jennie H. Stryker (Marion Broome), University of Alabama School of Nursing, Birmingham, AL, 35294-1210

Otitis media (OM) is one of the most prevalent childhood diseases in preschool children (CDC, 1990). This study examined parents understanding about OM, its' causative factors, and effective treatments. This project was a part of a larger study on literacy in rural Alabama. This study utilized a design in which 24 parents of children 6 months to 6 years who consented to participate completed the Knowledge of Ear Infection questionnaire (Curry, 2002). Seventeen of the participants were part of an Alabama literacy project and 7 were university students. The questionnaire consisted of 37 questions that were completed by most parents in 15 minutes. Knowledge scores of parents ranged from 62% to 92% on these questions. Depending on the risk factors, 56% to 72% could correctly identify 6 of the risk factors. Viruses were reported by 95% of parents as one of the causes of OM, yet 87% reported that children get better quicker with antibiotics. Although these parents were moderately knowledgeable about OM, its causes and treatment, nurses should continue to correct erroneous beliefs about underlying cause of OM and the influences of antibiotics.

SUCCESS OR FAILURE: WHERE STUDENT CHOICES LEAD.

Ina Warboys, College of Nursing, Univ. of Ala., Huntsville, AL 35899.

In the undergraduate level of nursing science, students must learn content material in preparation for applying the knowledge in patient care activities when they enter the nursing profession. Knowledge sources must be highly interconnected, and the students must be able to transfer the knowledge and skills beyond the initial learning situation. Students enter the nursing program with their individual patterns of study, whereby they learn and memorize material to achieve course grades. In nursing courses, it is imperative that the students adapt an effective pattern of study to learn and apply the information that underpins the practice of nursing. This study asked the question, "Do orientation activities lead students to make effective choices for success?" Cognitive flexibility theory is applied to explain the nature of learning in complex domains. Choice theory posits that we choose what we do and how we do it. An orientation event for application study preparation was offered to new undergraduate level nursing students. This study examines the students' choices and compares the choices to their academic outcomes. A future study will examine relationships between learning styles and choices for study.

PHARMACODYNAMIC AND PHYTOCHEMICAL INVESTIGATIONS OF *POLYPODIUM POLYPODIOIDES*

I. Watt, Norman J. Doorenbos, Department of Pharmacal Sciences, Harrison School of Pharmacy, Auburn University, Auburn, AL 36849 and Raghunandan Kumar Sharma, Indiana Department of Public Health, Indiannapolis, IN.

Polypodium polypodioides L. Watt (resurrection fern) is used as a medicinal plant in Cuba, Brazil, Peru and other Latin American Countries. It is native to the Southeastern United States.

This investigation was directed toward learning more about the chemistry and pharmacology of this native fern. Certain purified fractions of extracts were demonstrated to possess antimicrobial, hypotensive and/or antiarrythmic properties. The triterpenes 21-epifern-9-ene, serratene, neohopene, diploptene, clycloeucalenol, cycloeucalenone, cycloartanol acetate, cycloartanol benzoate and cycloaudenol benzoate and active fractions were isolated and characterized.

These results will be reported and future studies on this species will be recommended.

MACROAMYLASEMIA. Robert E. Pieroni, Dept. of Internal Medicine, UASOM-Tuscaloosa, Tuscaloosa, AL 35487. A. V. Mijummdar, Partlow Developmental Center, Tuscaloosa, AL 35404.

A young institutionalized male who was receiving valproic acid for mood control was noted, on several determinations, to have notably elevated serum amylase levels. This enzyme is frequently elevated in acute pancreatitis; however, the patient was not symptomatic for this disorder. After discontinuing valproic acid, hyperamylasemia persisted.. We suspected and were able to show that the patient had "macroamylasemia"—an uncommon but, fortunately, completely benign condition. We shall review in detail aspects of this interesting entity, and discuss the effect of various medications, including valproic acid, on pancreatic function.

Molecular Chaperone Involved in the Cellular Trafficking on Renin in the Human Kidney.

Marvin Jackson and Dr. Lee Aggison, Dept. of Natural Science, Stillman College, Tuscaloosa, AL 35403.

We seek to understand the issue of low plasma renin activity and to understand and characterize the molecular chaperones involved in the packaging and secretion of renin. African-American hypertension is characterized by a low activity of the renin-angiotensin-aldosterone system (RAAS), low plasma renin activity (PRA), and salt sensitivity. The low RAAS activity may be attributable to low PRA. The rate-limiting component of the RAAS is renin. To determine which molecular chaperones are involved in renin folding, modification, and packaging, the yeast two-hybrid system has been employed. We are currently cloning our bait protein and pre-screening our yeast two-hybrid system

EPIDURAL ABSCESS: CASE REPORT AND LIBERATURE REVIEW.

Ty Blackwell, 3rd Year Medical Student, UASOM–Tuscaloosa, Tuscaloosa, AL 35487. Robert E. Pieroni, Dept. of Internal Medicine, UASOM-Tuscaloosa, Tuscaloosa, AL 35487.

Because spontaneous epidural abscess is an uncommon disorder, diagnosis can be delayed, leading to disastrous sequellae—irreversible paralysis or death. The final outcome is closely related to the degree of neurological impairment prior to receiving appropriate antibiotic, and other medical and surgical therapy. We will describe the case of a young diabetic male complaining of fever and low back pain. His workup, treatment and outcome will be described, as will the general features of epidural abscess including predisposing factors, clinical manifestations and treatment. The need for prompt diagnosis will be underscored.

SURVEY OF BETA-CAROTENES IN NATIVE ZIMBABWEAN FRUIT

Andrew Patterson, Kaarina Lokko, Ragineé Edwards, and Racquel Stephenson, Oakwood College, Huntsville, AL 35896, N. Basopo, National Univ. of Science and Technology, Bulawayo, Zimbabwe, and Ephraim Gwebu, Dept. of Chem. and Physics, Elizabeth City State Univ., Elizabeth City, NC 27909

HIV/AIDS is a disease that has posed a significant health problem in Zimbabwe. The problem of HIV/AIDS in Zimbabwe is compounded with the problem of poor nutrition. Studies show that Vitamin A is a major micronutrient deficient in people living with the disease. Under the sponsorship of the Minority International Research Training Program of the National Institutes of Health, we spent 10 weeks at the Zimbabwe's National University of Science and Technology, Department of Biology and Biochemistry in the research lab of Dr. E. Mwenji and John Read. The purpose of our study was to determine levels of beta-carotenes (Vitamin A precursors) in Zimbabwe's traditional dietary fruits (wild or domestic) for possible recommendation for use by people suffering with HIV/AIDS. The indigenous fruits, *umkkomo* (baobab), *ubhuzu*, *umnyiyi*, *umviyo*, pawpaw, and *ijodo* (native melon), were passed through the steps of disintegration, saponification, extraction, column chromatography and finally measured spectrophotometrically for beta-carotene content. The tomato was used as a control because it is known to have a significant supply of Vitamin A. The results of this experiment displayed that the *ijodo* and the pawpaw had high levels of beta-carotenes, while the baobab, *ubhuzu*, *umnyi*, and *umviyo*, had lower levels of beta-carotenes, relative to the tomato. Therefore the *ijodo* and the pawpaw would be good sources of Vitamin A for those with HIV/AIDS.
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ENGINEERING AND COMPUTER SCIENCE

TRANSPORT IN GRASS SWALES.

Yukio Nara and Robert E. Pitt, Dept. of Civil and Env. Eng., Univ. of Alabama, Tuscaloosa, AL 35487.

I am conducting research in investigating the effectiveness of grass swales for sediment transport. Grass swales are vegetated open channels where collected stormwater runoff flows through. They are often used as an alternative to a concrete gutter for stormwater management because of their advantages of infiltration and filtration of stormwater. The aim of research is to understand the effects of different variables. The variables are slope, grass types, time interval, depth of flow, and length of swales. To analyze the variables, solutions with known concentrations of sands and fine particles of Aluminum Oxides are pumped onto inclined grass swales in different conditions for each variable. 108 samples were collected and analyzed by turbidity, total solids, and particle size distribution analysis to investigate the effects of the variables.

VALIDATING DISTRIBUTED REAL-TIME AND EMBEDDED SYSTEMS IN UNIFRAME.

Shih-Hsi Liu, Dept. of Computer and Information Sciences, Univ. of Alabama at Birmingham, Birmingham AL 35294.

Distributed Real-Time and Embedded (DRE) Systems are widely applied to large scale and mission critical application domains such as avionics systems and medical imaging. Due to the rapid lifecycle and the complexity of design of the systems, there is an urgent demand to manage the development of robust, COTS, and effective software for vendors. The UniFrame project is a unified framework for seamless integration of distributed heterogeneous software components. This paper describes how the UniFrame approach is applicable to DRE software components. Our project starts from both functional and nonfunctional natural language specification. Then, leveraging the Two-Level Grammar (TLG) specification language and the Vienna Development Method (VDM), a formal methodology for developing DRE components and system code generation at the microarchitecture level is developed for UniFrame.

TRADITIONAL SIMULATION FOR SOLVING FUZZY WEB QUEUING SYSTEM PROBLEMS.

Xidong Zheng and Kevin Reilly, Dept. of Computer & Information Science, Univ. of Ala., Birmingham, AL 35294.

In this project, we want to solve web queuing system problems for web servers. We first introduce the system models, and then apply fuzzy theory to our models. We have two methods to obtain required system performance variables, such as Utilization, Number (of requests) in the System, Throughput, and Response Time. Firstly, we use fuzzy optimization to do the computation. Then, we used crisp queuing systems simulation. By appropriate analysis of the results we can obtain fuzzy performance results. Applying crisp simulation to solve fuzzy optimization problems constitutes an area of research which has not been explored. At the detailed level, we use crisp Poisson distributed arrival rates and exponentially distributed service times as input, simulate the system for a period of time, collect results, and through analysis obtain the fuzzy system performance. We deal with both single and multiple server cases. Comparison of the results of these two methods (optimization and simulation) reveals that they match very well. So, in this first time demonstration of conventional simulation being used to solve fuzzy optimization problems, we offer a methodology that reduces computation time relative to the typically very time-consuming (direct fuzzy) optimizations. There is an added 'bonus' in the simulations in that it provides distributions of variables for "free" i.e., as a natural outcome of the effort. The simulation methods, it would appear, can be applied to a whole host of other fuzzy optimization problems as well.

ADAPTIVE WEB BASED RESOURCE BROKER FOR THE GRID.

Enis Afgan, Dept. of Computer and Information Sciences, Univ. of Ala. at Birmingham, Birmingham, AL 35294.

Today, as Grid Computing is becoming a reality, there is a need for managing and monitoring the available resources worldwide, as well as the need for conveying these resources to the everyday user. This paper describes a resource broker with its main function being to match the available resources to the user's requests. One way of doing this is for a user to manually find available resources, manually connect to the remote computer and, manually enter the commands to be executed. This method is superseded with the use of the resource broker that provides a uniform interface to access any of the available and appropriate resources in the name of the user. This paper will discuss the process of creating the resource broker as well as provide insight in how it connects and relates to underlying software and protocols. The resource broker runs on top of the Globus Toolkit. Therefore, it provides security and current information about the available resources and serves as a link to the diverse systems available in the Grid.

STATISTICAL DISTRIBUTION ANALYSIS FOR STORMWATER CONSTITUENTS.

Alexander A. Maestre and Robert Pitt. Department of Civil and Environmental Engineering, University of Alabama, Tuscaloosa, AL 35487.

The University of Alabama and the Center for Watershed Protection were awarded an EPA Office of Water 104(b)3 grant in 2001 to collect and evaluate stormwater data from a representative number of NPDES (National Pollutant Discharge Elimination System) MS4 (municipal separate storm sewer system) stormwater permit holders. The initial version of this database, the National Stormwater Quality Database (NSQD, version 1.1) is currently being analyzed. It has been found that stormwater constituents can follow lognormal, normal or gamma distributions. When the lognormal distribution has been assumed only the mean and the standard deviation has been considered during the analysis. This paper evaluate the effect of include the third parameter in the fit if the lognormal distribution to stormwater constituents. Maximum likelihood and L-moments were used during the evaluation.

SCALABLE LINEAR ALGEBRA LIBRARY AND BENCHMARK.

Yin Liu and Anthony Skjellum, Dept. of Computer and Information Sciences, Univ. of Ala. at Bhm., Birmingham, AL 35294.

According to Amdahl's law, the speedup in solving a problem due to more computing power detains at a certain limit no matter how many processors are further added. We're making a linear algebra library scalable in the sense that it can keep efficiently solving larger and larger sizes of problems along with the increasing number of processors/computers. Exploiting hierarchical memory reuse in basic matrix operations at algorithmic level is our way to essentially raise the computing performance in a single processor. Divide and conquer algorithms, outstanding in its cache-friendly feature, are our recipe for distributed memory computing environment, as well as the load balance issue in parallel computing. As a consequence of the algorithm exploration, we're generating benchmark programs to capture the performance profiles of given single/parallel computing systems. The various benchmark numbers can not only reveal information like the best/half performance and the maximum capable problem size for a given system, but also give insights on how to enhance hardware resources to improve the system computing capability.

SOURCE QUANTIFICATION OF INAPPROPRIATE DISCHARGES TO STORM DRAINAGE SYSTEMS.

Veerabhadra Rao Karri and Dr. Robert Pitt, Department of Civil & Environmental Engineering, University of Alabama, Tuscaloosa, Alabama-35487.

Inappropriate discharges are non-stormwater discharges into a municipal separate storm sewer system (MS4) that are not covered by an existing National Pollutant Discharge Elimination System (NPDES) permit. Identifying and eliminating these inappropriate discharges to storm sewers is an important and cost-effective Best Management Practice (BMP) in a non-point source water pollution problem. Field screening procedures of dry weather flows which monitor for certain chemical and visual tracers that indicate potential sources are necessary to identify the sources. In this research a chemical mass balance model with *Monte Carlo* statistical simulation using Microsoft Visual Basic 6.0 was developed, which involves a statistical analysis of the tracers using their mass balance at the outfall. The numerical technique used in this model is to estimate mass contributions of different identified sources for a mixture water quality data set. Each mixture-water quality data set consisted of statistical parameters like mean, coefficient of variation and the type of distribution (Uniform, Normal, or Log-Normal) for an individual tracer from every source that is to be evaluated. Simulations were performed on this data set, to estimate these mass contributions. The input for this model is observed outfall concentrations for the sources selected for evaluation. The output of this model gives the most likely fraction of flow for each source type and shows the spread of the solutions. Good agreement was obtained between the prediction using the current model and the experimental results. Thus, using this model one can predict the main contributor to the inappropriate discharges in storm drainage systems at the outfall considered.

SEQUENCE ALIGNMENT ALGORITHM: MULTI-DIMENSION, MULTI-PROCESS.

Dr. Robert Hyatt & Garret Cox, Dept. of Comp & Info Sciences, UAB, Birmingham, Al 35294

A sequence alignment is performed on a pair (or more) of protein, DNA, or RNA sequences by inserting gaps between the bases (or amino acids) of the sequences in such a way that the sequences match to some degree. An optimal alignment provides the best such matching. Once an optimal alignment is complete, it is trivial to calculate the similarity of the set of aligned sequences, or to determine what regions are present, missing, and changed in each member of the set. Such information can be used to determine the evolution of a sequence or to investigate a new sequence's coding behavior. Whereas it is trivial to calculate the optimal alignment of a pair of sequences using a dynamic programming algorithm, it is much more difficult to derive the optimal alignment of 3 or more sequences. Existing methods generally return only a nearly optimal alignment, or take unfeasibly long to compute. Distributing the work over a large cluster, however, can drastically reduce this run time.

PROCESS ENGINEERING AGENT FRAMEWORK USING ENTROPY MANAGEMENT.

Rajani S. Sadasivam, Department of Electrical and Computer Engineering, University of Alabama at Birmingham, Birmingham, AL, rajani@uab.edu.

We must increase automation of the software development process because of the wicked nature of its problems, which are both difficult to define and difficult to solve. We must overcome classic software problems such as semantic gap to achieve this automation. Mature engineering disciplines have achieved great deal of success by developing products by integrating standardized components of a supply chain. The Web Services initiative is focused on developing standards and tools for developing such a supply chain of software components. Therefore, we propose that software development should just become a matter of correlating problems to system of Services. We argue that once we achieve this correlation we can develop systems by dynamically forming agencies, as Minsky noted. In our research, we are developing a process model for the Intelligent Correlation of Services Agent (ICSA) framework for providing systematic approach for automated selection of Services. We are using the ICSA framework for developing the virtual university system. We are also developing an Entropy Model (EM) for modeling the clusters of Services. As test cases, we have successful applied EM for modeling cross-disciplinary partnerships of organizations and selecting packet trunk groups in telephony systems.

Elders' Impressions of Ethicolegal Issues in Healthcare: A Qualitative Study.

Gabriella H. Cooper and Ellen B. Buckner, University of Alabama School of Nursing, University of Alabama at Birmingham, Birmingham, AL 35294-1210

Ethicolegal issues in healthcare play a leading role in the satisfaction and comfort patients relate to hospital care. Ensuring that patients perceive their care in a positive light not only helps the hospital, but also aids geriatric patients by decreasing anxiety that may inhibit their healing. Ethicolegal issues are those topics that involve both ethical and legal principles, such as autonomy and informed consent. The issues addressed herein include advance directives, basic human needs, healthcare decision-making, and general nursing care. The purpose of this study was to investigate the perspectives of elders regarding geriatric care. Seniors ages 65 and older were interviewed with the Seniors' Perspectives Regarding Elder Care Issues (SPRECI) questionnaire to obtain qualitative responses. Eight open-ended questions developed by the investigator comprised the SPRECI. This questionnaire was reviewed for content validity by a CNS with cardiovascular and administrative experience, a faculty member with experience in geriatric nursing, a faculty member with experience in ethicolegal issues, and another with experience in research methods. Nine elders have been interviewed to date. Findings show that most elders commend hospital care as effectively provided to geriatric patients however these responses may reflect socially acceptable answers. To counter this tendency, future interviews are planned for community settings. This study was supported in part by a grant from the UAB Center for Aging.

SEDIMENT TRANSPORT IN GRASS SWALES.

Yukio Nara and Robert E. Pitt, Dept. of Civil and Env. Eng., Univ. of Alabama, Tuscaloosa, AL 35487.

Grass swales are vegetated open channels through which collected stormwater runoff flows. They are often used as an alternative to concrete gutters for stormwater management because of their advantages of infiltration and filtration of stormwater. The objective of this research is to understand the effect different variables have on stormwater filtration and infiltration in grass swales. The variables to be studied are slope, grass type, time, depth of flow, and length of swales. To analyze these variables, solutions with known concentrations of sands and fine particles of aluminum oxide are pumped onto inclined grass swales and a variety of configurations of the study variables are measured. To date, 108 samples have been collected and analyzed for turbidity, total solids, and particle size distribution. Outdoor experiments will be conducted to extend the length of grass swale and to confirm the results obtained from indoor experiments.

SURFACE RECONSTRUCTION USING GAMMA SHAPES, Ying Sun, Kenneth R. Sloan Dept. of Computer Information & Sciences, Univ. of Ala at Birmingham, Marietta E. Cameron Dept. of Computer Science Birmingham-Southern College.

In this paper, we examine a modification to our three-dimensional point cloud reconstruction method, Gamma Shapes. Gamma Shapes is an extension to Alpha Shapes with the advantage that the Gamma Shapes method allows the automatic selection of local scaling factors. This presentation examines scaling methods based on simple approximation of the point sets medial axis. And we compared the results of different methods usng the information of normals of points.

TRACKING STORMWATER HEAVY METAL SPECIATION CHANGES FROM SOURCE AREAS TO RECEVING WATERS. Renee E. Morquecho and Robert E. Pitt, Dept. of Civil and Env. Eng., Univ. of AL, Tuscaloosa, AL 35487.

Many studies have identified heavy metals in urban runoff as a major contributor to the degradation of urban streams and rivers. Metals can occur as dissolved, colloidal and particulate-bound species, and their environmental health effects and control strategies can be quite different, based on their specific forms. Therefore, it is important to measure all forms of heavy metals, especially the particulate and filterable fractions, when determining their fate and effects. The objectives of the proposed research presented are to measure the changes in metal association/ speciation from source areas to small urban receiving waters. The associations of heavy metals (along with some major constituents and nutrients) with different-sized particulates will be determined using cascade sieves and filters. Sequential extraction experiments will also be conducted to examine the treatability and other characteristics of the filterable (<0.45 μm) portion of the heavy metals using Chelex-100 resin, UV-light exposure, and Anodic Stripping Voltammetry (ASV). It is hypothesized that metal associations will change as stormwater moves from source area(s) to receiving water(s). Those metals more associated with large particulates will be removed from the flow water due to natural sedimentation processes first, while the metal fractions associated with the smaller and/or dissolved particles will be the prevalent forms found in receiving water(s). Also, metals in the filterable fraction will be more likely to occur in free ionic form as opposed to being associated with organic/inorganic or colloidal complexes.

SOURCE VERIFICATION OF INAPPROPRIATE DISCHARGES TO STORM DRAINAGE SYSTEMS.

Soumya Chaturvedula and Robert E. Pitt, Dept. of Civil and Env. Eng., Univ. of Alabama, Tuscaloosa, AL 35487.

Investigation of non-stormwater discharges into storm drainage proceeds along a hierarchy of procedures. Exploratory techniques involve an extensive mapping effort to identify the locations of all outfalls for sampling. This is followed by the screening analyses at the outfalls which include sampling at repeated intervals at the outfalls, to measure chemical tracers which would identify the general categories of non-stormwater flows. Using a Flow chart method and a modeling package, the most probable source of inappropriate discharge into the storm drain system can be identified. The final verification process entails the identification of problem outfalls and field investigation of these problem outfalls by surveying the contributing watershed. The above methodology has been employed at Tuscaloosa, Alabama, to study the sources of illicit discharges into the Cribbs Mill Creek. The field verification of the results is being completed.

THE NATURE OF THE IMPERVIOUSNESS IN URBAN WATERSHEDS.

Celina Micu and Robert E. Pitt, Dept. of Civil and Env. Eng., Univ. of Alabama, Tuscaloosa, Al 35487-0205.

Local development characteristics are the most important elements that affect stormwater quality and quantity. In this study, 136 neighborhoods were surveyed to determine the critical development characteristics representing 18 major land use areas located in Little Shades Creek Watershed, Birmingham, AL.

Field data were collected during an earlier research project to determine the sources of urban runoff and the associated pollutants and to examine the alternative controls in this rapidly developing area. This research uses the same field data to calibrate WinSLAMM (Source Loading and Management Model), to determine the runoff quantity generated by the 136 sites and by the 18 major land uses. Statistical analyses will be then conducted at several levels to determine how land development variability affects the calculated yields. WinSLAMM runoff data will be validated against the National Stormwater Quality Database (NSQD, version 1.1) for Jefferson County, AL, which is part of the University of Alabama, Department of Civil and Environmental Engineering Research and is used as a benchmark for comparison with locally collected data.

STORMWATER TREATMENT AT CRITICAL SOURCE AREAS USING UPFLOW FILTERS.

Uday Khambhammettu and Robert E. Pitt, Dept. of Civil and Env. Eng., Univ. of Ala., Tuscaloosa, AL 35487.

A number of studies have linked specific pollutants in stormwater runoff with critical sources such as paved parking lots and gas stations. Runoff from these areas has been observed to be contaminated with concentrations of many critical pollutants especially heavy metals and PAHs. These paved areas are usually found to contribute more of the pollutant loadings than their areas would normally indicate. Numerous manufacturers have developed proprietary devices to treat stormwater runoff at these critical source areas. These devices have been designed to treat a variety of stormwater pollutants such as solids, metals, oil and grease, nutrients and bacteria. Very few have been designed to treat a broad list of these pollutants in a single device. This research is focusing on the demonstration of the effectiveness of an upflow filtration setup for the treatment of stormwater runoff at critical source areas and will be tested for the removal of many stormwater pollutants. This project will also look into the head loss and associated treatment rate change during filtration.

WEBRUN: A UNIFIED PLATFORM SUPPORTING GRID COMPUTING ENVIRONMENTS.

Zhijie Guan, Yin Liu, Vijay Velusamy, and Purushotham V. Bangalore, Dept. of Computer and Information Sciences, Univ. of Ala. at Bhm., Birmingham, AL 35294.

The evolution of the Grid has influenced the ever-growing need to have a uniform platform to access various kinds of programs, hiding as much heterogeneity among programs as possible. Current research adopts a hierarchical architecture that provides users a programmatic interface to access the web services on remote machines hiding all the underlying functionality within the actual running environment. However, programmatic interfaces are insufficient to support the requirements of the user. A friendly web interface may be more beneficial to users who do not wish to concentrate their efforts on programming. This paper presents the development of a unified platform, namely WebRun, which provides users with both a web interface and a programmatic interface to command-line programs located on remote computing resources. The web interface, a browser/JSP implementation of the user/system ports, supports the finding, starting, controlling, and utilization of command-line application programs. The programmatic interface enabled by WASP client/service model provides users a Java interface to access the programs stored on the remote resources that are otherwise not accessible.

GENPARSE: AN EVOLUTIONARY APPROACH TO CONTEXT-FREE GRAMMAR INDUCTION.

Faizan Javed, Department of Computer & Information Sciences, University of Alabama at Birmingham, Birmingham, AL, 35294-1170.

While grammar inference is used in areas like natural language acquisition and pattern recognition, its application to the programming language domain has been limited. We propose facilitating domain-specific language development, and building renovation tools for legacy systems, as new application domains for grammar inference. Many well established techniques exist for inferring regular languages however inferring context-free grammars (CFG's), which are more expressive and powerful than regular languages, is still an open research problem. Our current research focus is to investigate the genetic programming (GP) paradigm for inferring CFG's. Preliminary work using grammar-specific heuristic operators in tandem with non-random construction of the initial grammar population resulted in successful induction of small grammars. We extend that work and propose the use of syntax graphs and derivation trees to be able to infer a more comprehensive set of CFG's. Our project aim is to research on methodologies of CFG induction under various constraints (use of positive or negative samples, or both) limited not only to the GP model of computation, but also open to investigating other existing models of grammar inference like the MDL approach, in the hope of being able to infer real world grammars.

QUALITY OF SERVICE PREDICTION IN COMPONENT-BASED DISTRIBUTED SYSTEMS.

Changlin Sun, Dept. of Computer and Information Sciences, University of Alabama at Birmingham, Birmingham, AL 35294

Developing distributed software systems by assembling commercial-off-the-shelf (COTS) software components has well-known advantages of reducing the development cost and time to market. However, the component-based software development poses some new problems and challenges due to its use of a different underlying process from traditional software development approaches. One of the major challenges is the compositional reasoning about the system Quality of Service (QoS). Compositional reasoning about system QoS is necessary in (COTS) component-based software development. It allows the static validation of the QoS of a software system based on the QoS assured by individual software components without a need to examine or otherwise analyze the implementations of those individual components. Compositional reasoning about QoS makes it possible that the component developers can develop and certify components independently and system designers can build a system and predict the system QoS with the given QoS of its components. This shifts the burden of QoS assurance from the system developer to the component developer. Software component developers provide rich information for predictable assembly (design for reuse) and the system developers reuse the QoS information provided by components during system integration (design with reuse). We examine the categories of software artifacts that are needed to facilitate the QoS prediction in developing component-based distributed systems. This research was supported by US Office of Naval Research under award number N00014-01-1-0746.

OVERLAPPING OF COMPUTATION, COMMUNICATION, AND I/O FOR HIGH PERFORMANCE PARALLEL COMPUTING.

Vijay Velusamy, Dept. of Computer and Information Sciences, University of Alabama, Birmingham, AL 35294.

There has been growing interest in large-scale cluster/grid computing systems having thousands of processors, for computational simulations, including but not limited to bioinformatics, and earth simulations. Although there has been significant research on novel algorithms, computing environments, high performance interconnects for such systems, and overlapping of computation and communication, there has been little interest in studying the issues and benefits of overlapping I/O. This study analyzes some of the emerging technologies for storage networks such as InfiniBand and Remote Dynamic Memory Architecture (RDMA). These technologies support CPU-offload for their communication protocols, allowing the CPU's to be used more effectively for computations, rather than for communication, or Input/Output (I/O). This is beneficial for overlapping computation with communication and I/O, and for effective resource utilization. The study shows that overlapping of computation, communication, and I/O will allow better application performance for large-scale systems. It is even more interesting to analyze similar issues relating to storage access in grid computing environments. Typical applications of this would include efficient check-pointing for rollback recovery to create fault-tolerant environments, and predictive reading of data for real-time visualization of biomedical simulations on a visualization-wall.

ANTHROPOLOGY

A PRELIMINARY COMPARATIVE ANALYSIS OF CARBONIZED PLANT MATERIALS FROM THE HAMMONDS SITE, FORT PAYNE, ALABAMA (1DK71).

Heather McCoy, Mijitaba Hamissou, Harry Holstein, Hunter Johnson, and Keith Little, Jacksonville State University, Jacksonville Alabama, 36265.

The Hammonds site in Fort Payne Alabama is a significant multi-component archaeological site. Early Woodland mortuary activities at the site reflect a rich and varied use of indigenous plants. The long-term occupation of this site offers a look at the changing trends in plant use that influenced the people and dictated their actions. The botanical remains tell us a great deal about the subsistence strategies used, and the later availability of domesticated plants that changed lifestyles. This paper focuses primarily on burial features from the early Woodland time period, and how the subsistence strategies compare to two other similar sites. Flotation samples were screened for botanical remains using what is a more or less standard procedure. Preliminary data indicates a high frequency of hickory nuts and acorn, suggesting a heavy reliance on these indigenous plants for subsistence.

CREATING POSITIVE RELATIONS THROUGH COMMUNICATION, GETTING TO KNOW THE MOWA CHOCTAW.

Rebecca Turley Ridley, Department of Anthropology, Univ. of Ala. at Birmingham, Birmingham, AL 35294 and Archaeological Resource Laboratory, Jacksonville State University, Jacksonville, AL 36265.

Since the inception of American archaeology as a discipline, the relationship between Native Peoples and archaeologists has been a strained one at best. Native Peoples feel that archaeologists have not made concerted efforts to listen to the varied voices regarding archaeological practice. Moreover, until recently, many Native Peoples have not been given ample opportunity to present their opinions on these issues to large audiences of archaeologists or anthropologists.

In response, I have conducted a study with the MOWA Band of Choctaw Indians (MOWA Choctaw). The objective of this research was to gain insight into one Native-American group's views regarding current archaeological practices, as well as to understand the premises for those views. Based on background research, along with attitudes displayed and opinions expressed during an archaeological excavation of 1Mb311, located on the MOWA Choctaw Reservation, interpretations were made concerning Native-American views in regard to current archaeological practice. Ultimately, this research, along with data gained from additional sources, lead to the development of a model that would help ensure open and mutually beneficial communications between Alabama archaeologists and Native Peoples.

A COMPARATIVE CHEMICAL ANALYSIS OF PAINT PIGMENTS ON NATIVE AMERICAN INDIAN CERAMICS FROM KASITA (9CE1) AND PRIDE PLACE (1TU1).

Priscilla B. Ward and Hunter B. Johnson Archaeological Resource Laboratory, Jacksonville State University, Jacksonville, AL 36265

The use of pigment producing minerals and plants was prevalent in American Indian cultures over a long period of time. The use of paints to decorate pottery increased during the late prehistoric and early historic periods. The purpose of this research was to determine variability in the chemical composition of pigment-producing minerals utilized by Native Americans. Samples of painted ceramic sherds recovered from Pride Place (1Tu1) and Kasita (9Ce1) were studied. In addition, raw hematite and limonite samples collected from several archaeological sites in Alabama were analyzed. Chemical analysis was carried out using a scanning electron microscope with an energy dispersive scattering attachment. Analyzed samples include pulverized raw minerals, as well as pulverized and flaked paints taken from pottery sherds. This paper compares identified paint compositions from both Pride Place and Kasita with each other, as well as with collected raw samples. Results indicate that significant variability exists between both individual samples, as well as within pigments taken from the same ceramic fragments.

LATE PREHISTORIC POLITICS IN NORTHWEST GEORGIA.

Ramie A. Gougeon, Panamerican Consultants, Inc., Tuscaloosa, AL 35404.

Blanton et al.'s (1996) dual-processual model has been adopted and adapted by Southeastern North American archaeologists as a means of explaining the complex political arrangements that evolved during the Mississippian period. The use of this model is not without its detractors. Coosa, a late prehistoric chiefdom in northwest Georgia, provides the means of examining the model within a political system at several scales, namely that of the village, chiefdom, and paramount chiefdom. I suggest that the political elite of Coosa utilized corporate strategies, network strategies, and combinations of the two to maintain socio-political control at these varying scales.

DAVIS FARM ARCHAEOLOGICAL COMPLEX, CALHOUN COUNTY, ALABAMA, TWENTY-FIVE YEARS OF ARCHAEOLOGICAL INVESTIGATIONS.

Harry O. Holstein and Daniel L. Brooks, Dept. of Physical and Earth Sciences, Jacksonville State University, Jacksonville, AL 36265.

The Davis Farm Archaeological Complex consists of fifteen archaeological sites that lie within .8 kilometers (1/2 mile) of one another near the confluence of Boiling Spring and Choccolocco Creek, one mile southeast of Oxford, Alabama. The focal point of the complex is a large truncated Mississippian earthen mound, 1Ca196. Over the past twenty-five years excavations at several of the Davis Farm sites have yielded substantial information concerning aboriginal populations in northeast Alabama.

MOUNDVILLE MOUND V DAUB: ITS ROLE AS AN ARCHITECTURAL INDICATOR.

Jeffrey L. Sherard, University of Alabama, 1 Circlewood Tuscaloosa, AL 35405.

Recent archaeological excavations focusing on Mound V at the Moundville site have revealed the remains of two large structures. One of the structures, referred to as an earth lodge, is a very unusual building type that has never been discovered in Alabama. The earth lodge was constructed during the Moundville III phase (A.D.1400 to A.D. 1550). This chronological position is important as it denotes the construction as occurring during the demise of the Moundville chiefdom. By analyzing recovered daub, clay mixed with grass temper used primarily to fabricate prehistoric structure walls, we now know that this rare edifice type was constructed by non-traditional techniques. This paper presents results from the Mound V daub analysis and applies these results to a discussion concerning the architectural form and the construction methods used to build the Moundville earth lodge and associated structure.

BIOETHICS AND HISTORY & PHILOSOPHY OF SCIENCE

THE FATE OF THE SCIENCES. Gerard Elfstrom, Dept. of Philosophy, Auburn Univ., Auburn, AL, 36849-5210.

By and large, those who discuss the fate of the sciences divide into two camps. The first includes those convinced that the sciences will be complete after a few major problems are solved. Partisans of this camp commonly presume there are a finite number of forces, particles, or bodies in the universe. Once these are understood and explained, science will be finished. The second camp holds those who argue that the sciences will never come to an end. They claim either that the end of science has been proclaimed many times in the past, but science, blind to the wisdom of those claims, rose to greater heights, or that solving scientific problems always generates new ones. The arguments of both camps are unsatisfying because they give no reason why past scientific advances will continue or why we can expect to find no more phenomena to investigate. Lately, Stephen Hawking has joined the camp of those who believe science will never come to an end. His argument intrigues because he attempts to explain why, in principle, science can never be complete. I propose to examine and assess his argument.

CAN AN EMBRYO BE A PERSON? James T. Bradley, Department of Biological Sciences, Auburn University, Auburn, AL 36849.

Twenty first century biotechnologies including therapeutic cloning (TC), production and use of embryonic stem cells (ESC), and preimplantation biopsy (PB) give fresh urgency to defining personhood. What is a person? When does personhood begin? Are 5-day-old human blastocysts persons? Is it morally acceptable to destroy blastocysts in order to cure disease, repair injured tissues, or prevent birth defects. In his 1486 essay *On the Dignity of Man*, Renaissance philosopher Pico della Mirandola expressed his view on human nature from which a basic definition of personhood can be derived. Pico maintained that the capacity for moral choice-making distinguishes humans from other creatures. This view mandates that our use of biotechnology respect and protect humankind's choice-making capacity. A biological perspective requires identification of characteristics necessary for choice-making and also a start point for that capability. Sensory neurons first establish connections in the human brain at 5 weeks of development; moreover, it has not been ruled out that by this time sensory data are being stored, retrieved, and analyzed - all integral components of a choice-making capacity. A conclusion can therefore be drawn that the 5-week-old human embryo qualifies for personhood and the protection and respect attending that designation. Prior to this time human beings cannot qualify for personhood. Therefore, the human blastocyst is not a person. This analysis frees TC, ESC use, and PB from violation of personhood.

EUTHANASIA JURISPRUDENCE AND PHYSICIAN-ASSISTED SUICIDE.

Stephen W. White, Philosophy Department, Auburn University, Auburn, AL, 36849.

In the area of euthanasia jurisprudence, political conservatism coupled with a principled judicial conservatism in the form of *stare decisis* has often not only resulted in what I obviously personally believe is the worst public policy (because it gives a dishonest impression of what doctors are doing in caring for dying patients) but in what Supreme Court Justices attempt to avoid often at considerable cost—radical judicial opinions. By following the rule of precedent, the Supreme Court has managed to support through a series of contorted arguments, the most radical social policy in the area of euthanasia jurisprudence in the developed countries of the world surpassed only by Holland. At least one justice acknowledges that modern medicine *as practiced* really is more consistent with a more active role in the dying process than simply withdrawing care (Justice John Paul Stevens).

What has the Supreme Court done? The nine justices sitting on the federal bench have inadvertently and collectively pushed doctors into accepting a policy of *de facto* active, voluntary euthanasia. On the other hand, a more moderate approach is available in only one state: Oregon. And thoughtful commentators familiar with the socio-cultural dynamics of American society think that physician-assisted suicide (a medical option in the state of Oregon) is the most ethically appropriate fit as between policy and populations for the United States. This Oregon law incorporates appropriate legal, medical, and psychiatric safeguards to protect vulnerable groups and prevent medical abuse.

ON THE ETHICS OF ETHICALLY CONSTRAINING SCIENCE.

Peter Harzem, Department of Psychology, Auburn University, Auburn, AL, 36849.

Contemporary discussions of supposedly 'ethical' matters in the conduct of scientific research do not distinguish two fundamentally different categories of issues. One is the scholarly study of ethics that investigates what is entailed in the concept of morality, and the varieties of thinking which guide human conduct and by which such conduct may be judged. This is *Ethics*, which has a long and illustrious history from Aristotle's *Nichomachean Ethics* and before, through Kant's moral imperative, utilitarianism, to the present. The other is the contemporary trend in almost every walk of life to regulate the actions of individuals through a set of rules of conduct which typically are named 'ethical guidelines' and the like. In those instances the use of the word 'ethical' elevates them to a setting where they do not belong. These guidelines have no notable or explicit roots in *Ethics*, and the authority on which they are based may be no more than, say, a group of elected officials, or even owners of a company, who have decided the rules—often, no doubt, with good intentions. In practice such rules work quite well in the general interests of the society, but serious doubts arise when they are extended, in the name of ethics, to limit pursuit of new knowledge. For example the recent debates concerning genetic experimentation, stem-cell research, cloning, and the like and the various, some successful, attempts to limit them give rise to concern. There is room for inquiry into whether constraining pursuit of new knowledge—not only science—in the name of ethical considerations is itself *ethically* sound. At first sight it seems it is not.

CONSENT: BIOETHICAL AND LEGAL CONSIDERATIONS THAT SHAPE THE EXERCISE OF SELF-DETERMINATION. Jill A Ross, School of Nursing, UAB, Birmingham, AL 35294

Informed consent supports the ethical principle of autonomy and protects a person's legal right to self-determination. Self-determination occurs by making significant choices that affect one's life. As a legal doctrine, informed consent is regulated by law and is required for invasive medical procedures and participation in research involving human subjects. Although the three elements necessary for a valid informed consent (information, competency, and voluntariness) are well known, there are "real-life" barriers that can impede the achievement of one or more of these elements. Professionals control the flow of information, and may have the power to determine if a person is "competent" to make a decision. Furthermore, the legal determination of those capable to give consent and the way "voluntary freedom to choose" is defined may impact the exercise of informed consent. Questions include: "How can the approach that the professional uses to explain the 'facts' manipulate the decisional outcome? Why is a 15 year old mother able to seek immunizations for her baby, but not for herself? When does influence become coercion? If a person's options are externally limited, is his choice free? Who *is* 'the reasonable person'? How does one person's autonomy affect the exercise of another person's autonomy?" These issues will be discussed from the perspective of how a professional can support the ultimate goal of patient or participant self-determination.

HUMAN NATURE AND VALUE CREATION. Leonard W. Ortmann, Dept. of Philosophy, Tuskegee Univ., Tuskegee, AL, 36088.

Evolutionary theory, the idea of social conditioning, cultural relativism, and the modern and postmodern critiques of the idea of nature and essences have all served to cast doubt on the idea of a human nature, especially in the sense of a fixed, eternal essence. Recently, however, the political scientist, Francis Fukuyama, has argued for the centrality of this notion in relation to human genetic engineering. Fukuyama has argued that genetic engineering needs to be regulated and the concept of human nature must serve as the basis of such regulation. Such regulation is necessary, he argues, because our political rights and liberties are historically grounded in the idea of human nature. Fukuyama rightly points out the pivotal role of the idea of human nature in grounding our political life. He also persuasively argues that those who deny that human beings have a determinant nature invariably employ determinants of human nature in their descriptions of human or political life. However, while accepting many of Fukuyama's claims for the importance of the concept of human nature, I will argue against his largely Aristotelian conception of human nature. Instead, I accept, like most modern thinkers, that the concept of human nature needs to be updated to reflect the post-Darwinian understanding of both life and human life in particular. My central claim, however, is that while any concept of human nature must be consistent with the current biological understanding of life, it most go beyond a purely scientific understanding. Not only does the theory of human nature ground ethical and political thought, it also serves as the basis for the historical creation of new values. In this way, the gap between the scientific and moral dimensions of human life can be bridged.

HISTORY OF THE DIVISION OF FERTILIZER AND SOIL CHEMISTRY OF THE AMERICAN CHEMICAL SOCIETY 1909-2000. Richard C. Sheridan, Tennessee Valley Authority (Retired), 105 Terrace St, Sheffield, AL 35660.

The Division of Fertilizer Chemistry, one of the five original divisions of the American Chemical Society, was organized in 1909. Frank Berton Carpenter, chief chemist of Virginia-Carolina Chemical Company, became its first chairman. The new Division was initially interested mostly in better sampling techniques and analytical methods but eventually expanded its programs to include fertilizer manufacturing technology, soil chemistry, and other aspects of the fertilizer industry. The name was changed to the Division of Fertilizer and Soil Chemistry in 1952. In 1981, the Division successfully pioneered the use of a two-way telephone setup to teleconference its technical sessions to the National Fertilizer Development Center, Tennessee Valley Authority (TVA), Muscle Shoals, Alabama. Many researchers from Muscle Shoals presented papers and served as officers from 1940 to 1997. Travis P. Hignett, of TVA, received the Division's first Merit Award in 1980. The Division dissolved and merged with the Division of Agrochemicals in 2000 because of major changes in the fertilizer industry, TVA's abolishment of its fertilizer research, and dwindling membership. During its 91 years, the Division provided a forum in which problems could be discussed and new developments shared with other researchers.

BIOTECHNOLOGY AND ENGLISH STUDIES: APPLICATIONS OF LANGUAGE THEORY TO GENETIC RESEARCH. Michelle Sidler, Elizabeth Cater Childs, Jessica Lueders, Dept. of English, Auburn Univ., Auburn, AL 36849.

This presentation surveys three issues related to genetic research which involve theories and methodologies based in English Studies. This first issue involves the history of the genome as an organizing principle for molecular biology. Throughout much of the 20th century, DNA was often characterized as the primary component of cellular communication, creating a synecdochical relationship between the genome and all of molecular biology. However, this oversimplified view is increasingly being complicated with recent work in proteomics and other theories of molecular biology. The second issue involves the use of tropes in discussions of genetic research. The field of genetic engineering, particularly stem cell research and cloning, is characterized by an inconsistent use of metaphor, which leads to a sense of incommensurability. Consequently, scientists and ethicists have failed to create what Thomas Kuhn calls a "shared lexical taxonomy." Thus, it will be the job of scientists, rhetoricians, and teachers to frame a literary agenda that resolves this metaphorical ambiguity. The third issue is the parallel between work in genomic code and topics in writing studies. DNA sequences can be compared to traditional grammar and syntax of the English language. Extensions of this metaphor can also be seen in other English Studies areas. The uses of white space in writing can be applied to the concept of "junk DNA." White space is one example of how "reading" DNA text parallels that of printed texts, illustrating that DNA literacy, mirroring the work of English Studies scholars, will soon develop.

UNDERSTANDING THE ANTI-NUCLEAR MOVEMENT: WHAT THEIR SUCCESSES CAN TEACH US ABOUT OUR FAILURES. Keith Gibson, Department of English, Auburn University, Auburn, AL 36849.

Scientists have long been content to leave public debates about science to non-specialists, many of whom are harshly critical of new technologies. There are many reasons for this policy: one of the most important is that these debates have generally had almost no effect on scientific advancement. The anti-nuclear movement of the 1970s and 80s, however, changed all that when a relatively small group of activists turned public opinion against nuclear power by associating it with three specific ills—weapons, meltdowns, and radioactivity. In this essay, I address the factual errors with each of these identifications and argue that the general principle of autonomous technology is flawed. More importantly, however, I urge scientists to no longer ignore the attacks leveled at their work; these debates, which can shape public policy, are much to important to be left to critics with no scientific expertise.

Dude, Only Grownups Die: Bioethical Considerations of *In Loco Parentis* on College Campuses. Kenneth E Nusbaum, Department of Pathobiology, College of Veterinary Medicine, Auburn University, AL 36849. nusbake@vetmed.auburn.edu

ABSTRACT One of the many structures of our society shattered in the late 1960s was the matter of "in loco parentis" on many college campuses. The college could no longer act as parent to the student, a change brought about by claims of adult hood, personal freedom, and several summers of love. Regardless of how effective these old strictures may have been, the willingness of college students to assume responsibility for their personal, communal, or supervisory behavior has never been impressive as the current proliferation of cautionary websites attests. The current dangers of dwelling in densely populated areas such as dorms and apartment complexes have not been higher since the rampages of tuberculosis at the birth of the industrial revolution.

Behaviors of concern include but certainly are not limited to drug use, excessive exposure to UV light, alcohol use, violence and trauma, sex, eating disorders, and increasingly, prospective prophylactic vaccination. Looking back from a seat of wisdom and education, I assert that three of these behaviors, sex, alcohol use, and vaccination, are matters of legitimate concern for the University. The University must develop a policy for each of the behaviors that best fits the relationship established with its students.

GORGAS SCHOLARSHIP AWARDS
March 19, 2004

Today the Gorgas Scholarship committee announced the rankings of the finalists of the 2004 Alabama Science Talent Search. The Search was held at the meeting of the Alabama Academy of Science at the University of Montevallo, Montevallo, Alabama.

The winner of the first-place tuition grant of $4000 was:

Sergey Sergeyevich Sarkisov, 2305 Fleer Circle, Huntsville, AL, 35803, Virgil I. Grissom High School, 7901 Bailey Cove Rd, Huntsville AL 35802, Teacher-Deborah Ormond.

First alternate and winner of a tuition grant of $3000 was:

Hannah Elizabeth LeMaster, 122 Mauldin Avenue, Florence, AL 35634, Brooks High School, 5630 Hwy 72, Killen AL 35645- Teacher-Vicki Farina.

Second alternate and winner of a tuition grant of $2000 was:

Ashrit Reddy Kamireddi, 8011 Smoke Rise Road, Huntsville, AL, 35802, Virgil I. Grissom High School, 7901 Bailey Cove Rd, Huntsville AL 35802, Teacher-Lady Emrich.

Third alternate and winner of a tuition grant of $1500 was:

Alisha Sara George, 315 Star Trek Drive, Indian Springs, AL, 35124, Jefferson County International Baccalaureate School, 6100 Old Leeds Rd, Birmingham AL 35210, Teacher-Debbie Anderson.

Fourth alternate and winner of a tuition grant of $1000 was:

Shrayesh Naran Patel, 1066 Forestdale Blvd., Birmingham, AL, 35214, Jefferson County International Baccalaureate School, 6100 Old Leeds Rd, Birmingham AL 35210, Teacher-Debbie Anderson.

(F) National Finalist, (S) National Semi-finalist

Unranked Finalists

Roshan Ara Ahmed, 338 Robbins Beach Road, Killen, AL, 35645, Henry A. Bradshaw High School, 1201 Bradshaw Dr, Florence AL 35630, Teacher-Lori Chittam.

Elijah Wade Riddle, 408 Seminole lane, Trussville, AL, 35173, Jefferson County International Baccalaureate School, 6100 Old Leeds Rd, Birmingham AL 35210, Teacher-Debbie Anderson.

Auroop Mukherji Roy, 510 Robinhood Drive, Florence, AL, 35633, Henry A. Bradshaw High School, 1201 Bradshaw Dr, Florence AL 35630, Teacher-Lori Chittam.

Natasha C. Sanderfer, 4259 County Road 31, Killen, AL, 35645, Brooks High School, 5630 Hwy 72, Killen AL 35645- Teacher-Vicki Farina.

The rankings were established by a panel of judges consisting of department heads, deans and professors from many of the leading universities and industries in Alabama. Winners and finalists in the Gorgas Contest receive offers of tuition scholarships to colleges and universities in Alabama for the study of science. The Gorgas Scholarship Program is named for General William Crawford Gorgas, the Alabama physician who conquered yellow fever in the Panama Canal Zone and later became the Surgeon General of the United States Army. The purposes of the Gorgas competition are to promote interest in science and to aid in the education of promising students.

Minutes
AAS Spring Executive Committee Meeting
Anna Irvin Dining Hall
University of Montevallo
Montevallo, Alabama
March 17, 2004

A. Dinner

Immediately following dinner, President Anne Cusic called the meeting to order at 7:25pm. The minutes of the fall meeting of the Executive Committee (10/18/03, University of Alabama at Birmingham) were distributed and approved.

B. Officers Reports

1. Eugene Omasta (**Board of Trustees**) had no written report. He reminded members of the Executive Committee that there would be a lunch for all Trustees, Elected Officers and the Executive Director on Thursday, March 18, in the Anna Irvin Dining Room.

2. Anne Cusic (**President**) submitted the following report:

   Since the Fall Executive Meeting, I have been involved with the following activities:

   - I presided over the Fall Executive Committee Meeting, Oct. 18, 2004
   - I worked with Richard Hudiburg to update the website for the 81st Annual Meeting
   - I worked to fill vacancies on committees
   - I attempted to update mailing and email addresses for committee members
   - I tracked down the chairs and vice-chairs of various sections
   - I worked with Steve Watts to reorganize the Research Committee and to convert to electronic submissions for applying for student competitions
   - I worked with Priscilla Holland on the 2004 resolutions
   - I sent a thank-you letter to Dr. Dan Holliman for his help in arranging the Fall Dinners of the Steering Committee for the past several years
   - I sent a thank-you letter to Dr. Neal Berte, President of Birmingham-Southern College, for supporting the Fall Dinner of the Steering Committee over the past several years
   - I reviewed the updated proposed budget with Elizabeth Dobbins
   - I consulted with the Location of Meeting Committee to determine the location of the 2005 meetings
   - I received the final expenses for the 2002 meeting at the University of West Alabama and arranged to settle the account
   - I worked with Houston Byrd on various aspects of the 2004 meeting at the University of Montevallo
   - I updated the AAS information in the NAAS Directory
   - I wrote the President's welcome for the meeting's program booklet

- I attended a meeting with the officials of Birmingham-Southern College to discuss the 2005 meeting on that campus
- I worked with Larry Davenport to identify vacancies in Academy offices
- I sent letters of congratulations to Drs. Norman Doorenbos and Lyman Magee for winning the Carmichael Award
- I sent a letter of congratulations to Dr. William Barrett for being selected for the Gardner Award
- I sent out information about the Spring Executive Committee and Dinner
- I worked with Dail Mullins to inform the AAS members of the "Alternate Theories on Origins" legislation
- I communicated with Ken Marion about issues for the long-range planning committee
- I assisted Houston Byrd in developing the Banquet Program
- I discussed the proposed revisions of the constitution with Steve Watts
- I worked with the Executive Director, Larry Krannich, on various Academy issues
- I directed numerous emails to appropriate Academy members for action

3. Ron Jenkins (**First Vice-President and President Elect**) submitted the following written report:

   - We have secured an invitation from the Vulcan Material Center for Environmental Education and Stewardship to support the 2004 Fall Steering Committee Dinner in the Rotunda Club on the Samford University Campus. It is expected that this may be a standing arrangement. Tentative date: October 29/30, 2004
   - Interacted with Larry Davenport with regard to office nominations for 2004-2005
   - Reviewed the Constitution and By-Laws of the AAS
   - Reviewed the Constitutions and activities of other State Science Academies
   - Received an offer from Samford University to host a future annual meeting of the AAS

4. Larry Davenport (**Second Vice-President**) – see **C17**

5. Dail Mullins (**Secretary**) submitted the following report of his activities over the preceding five months:

   - Transferred all checks/cash received for dues to the Treasurer after recording information on the master roll (kept by Kathryn Pitt – **kpitt@uab.edu**);
   - Attended pre-conference planning site visit to the University of Montevallo;
   - Provided the editor of the *JAAS* with membership rolls and mailing labels as requested;
   - Made requested mailing address and/or email address changes to the master roll upon receipt of information from individual members;
   - Provided membership rolls/lists to Section Heads as requested by them or the Executive Officer;

- Submitted minutes of the spring and fall 2003, AAS Executive Committee meetings to the editor of the *JAAS* and AAS webmaster as requested;
- Developed an AAS distribution list of those members of the Academy for whom we have email addresses (all but about 125). This was used to send out dues notification cards, as well as material related to the passage of Senate Bill 336 ("Academic Freedom Act"—see **Report C3**) and a copy of proposed changes to the AAS Constitution prior to the Montevallo Conference.

Please note that I will be retiring from UAB and moving out-of-state effective July 2, 2004, and so will not be able to serve out my current term. I can agree to remain on as secretary through the above date, but the Executive Committee needs to begin a search for my replacement as soon as possible.

6. Betsy Dobbins (**Treasurer**) submitted the following report, together with an ex tensive list of Tables:

Total account balances as of 12/31/03 were $74,800.04 as compared with $72,813.21 on 12/31/02, which reflects a positive cash flow of $1,986.83. The 2003 budget had projected a deficit of $7,465.00. On the positive side, the Academy did receive revenue from the 2003 annual meeting and Larry Krannich has increased the support for the Journal. Dues income was above projections for the first time in a number of years. Gorgas income, Journal support and subscriptions, and interest income were at or slightly above budget. On the expense side, total annual meeting, officer, and journal publication expenses were below budget. Unlike 2002, we awarded a Mason Scholarship ($1,000) and gave $1,600 to the Junior Academy for 2003. All other expenses were near budget. Again, all International Science Fair finances were handled directly by the Academy. As discussed at the October Executive Committee meeting, neither income nor expenses related to the Science Olympiad are being handled by the Academy and these have been removed from the 2004 budget.

For 2004, we are operating with a budget that anticipates a slight increase in dues and a slight decrease in interest income. Expenses have been altered slightly to reflect a pattern of awards and expenses, with a large decrease in printing expenses for the journal and an added category for mailing. There have also been categories added for bank charges and website management. The flow-through expenses of ISEF have been increased to reflect the Oregon location. Income and expenditures are tracking what is expected for the first quarter of a fiscal year and we do not expect any unforeseen budgetary problems during 2004.

At this point in the proceedings, Eugene Omasta asked to present the report of the Finance Committee (**C2**), since they related to the Treasurer's Report. The Alabama Academy of Science continues to be in excellent financial condition with total assets of $74,800.04 as of 12/31/03. The assets for the past five years, as reported at the Fall Executive Committee meetins and Annual Spring meetings of the Academy, are shown below:

Period	Assets (End of Period)	Change	Period	Assets (End of Period)	Change
1/1-10/1999	$76,219		1/1-12/31/1999	$85,330	
1/1-10/16/2000	$72,814	-$3,405	1/1-12/31/2000	$74,049	-$11,281
1/1-10/12/2001	$71,763	-$1,051	1/1-12/31/2001	$75,813	$1,764
1/1-10/12/2002	$72,197	$434	1/1-12/31/2002	$72,813	-$3,000
1/1-10/12/2003	$71,403	-$794	1/1-12/31/2003	$74,800	$1,987

It appears that the downward trend in Academy assets has stopped. I believe the policies adopted at the annual meeting two years ago were contributing factors:

1. a $5 dues increase (effective 1/1/03); and
2. the reduction of the number of Journal issues from four to three by combining the abstract issue with one of the other issues

However, journal printing expenses were only $350 this past year. A clearer picture of the Academy's financial condition should materialize this year when three Journal issues are published.

Online registration should have a positive effect on attendance and membership at this annual meeting. In addition, I believe increasing membership and monitoring Journal expenses should continue to be primary goals.

7. Jim Bradley (**Journal Editor**) submitted the following report:

Although publication of the *JAAS* is behind schedule, submissions are beginning to pick up, boding well for the upcoming year. The April, 2003, issue containing last year's abstracts is printed and about to be mailed out. Volumes 3 and 4, 2003, will be published as a combined issue containing 5-6 full length articles. I recommend that the July and October issues be published jointly in the future rather than April/July as discussed last year. The abstract issue can easily stand by itself...

The Auburn University Library account for the journal is exhausted until the beginning of the 2004-05 FY in October when I expect the usual $4,791 to be added to it. The Davis Printing Company in Montgomery, AL, is doing a good job publishing the journal.

As I announced last year, I wish to pass the editorship to another fortunate person at the end of my present term, or earlier. An individual at Jacksonville State University has expressed interest in the position.

8. B. J. Bateman (**Counselor to AJAS**) – No formal report. Dr. Bateman reported that attendance was "way down."

9. Virginia Valardi (**Science Fair Coordinator**) – No Report

10. Jane Nall (**Science Olympiad Coordinator**) submitted a written report:

Perhaps the best kept secret in the State, many volunteers of Alabama Science Olympiad provide students the opportunity to participate and compete in Science Olympiad. Teachers, parents, coaches, bus drivers, university professors, university work study students, and other volunteers work to provide the students of Alabama the joys of "doing science" in an arena resembling athletic tournaments.

Herculean efforts are made each year by staff and volunteers on several university campuses, as well as teachers, parents, and students of over 200 public and private schools, so that these young students might experience the joys and thrills of doing lab hands-on science.

Placing 10th in the nation for membership, Alabama Science Olympiad continues to grow in numbers of teams and participation at all levels. For several years now, because of the number of teams registering in Alabama, two teams in both Division B (grades 6-9) and Division C (grades 9-12) have advanced to the national competition following successfully competing at regional and state tournaments. Only the top ten states in membership receive the second invitation at the secondary level to compete at the national tournament. The elementary levels compete at various local and regional tournaments.

This year the University of West Alabama hosted an A2 tournament and reported they had a great time, and they are already planning next year's tournament. ESO at Auburn takes place May 1, and will have as many as 40 teams competing. There were five regional C tournaments and four regional B tournaments. We really need at least one more B host! Alabama B was held recently at Huntingdon College and Alabama C will be on the campus of Samford University in April.

Science Olympiad events address the National Standards for Science Education and comprise all areas of science including astronomy, metcorology, experimental design, genetics, anatomy, process skills for life science and biology, chemistry and polymers, physics, earth science and fossils, water quality and the environment, map skills, GIS and remote sensing, as well as building events such as a Rube Goldberg-like device, robots, bottle rockets, plane, bridge and tower building, and musical instruments. Alternating events in taxonomy include topics of trees, amphibians and reptiles, birds, and insects.

Director Nall is in search of more universities willing to host tournaments! Consider showcasing your campus and join us in the fun! The State Director is appointed by the Alabama Academy of Science. To date, Alabama has been led by two directors: Mr. Steven Carey, University of Mobile (1985-1996); Ms. Jane Nall, UMS-Wright Preparatory School and University of Mobile (1997-present)

11. Steve Watts (**Counselor to AAAS**) submitted the following report:

    The annual meeting for the AAAS affiliates convened on February 13, 2004, at the Washington State Convention Center in Seattle, Washington. At that meeting there was a review of OMB Peer Review Guidelines, a discussion concerning issues of visas for foreign research scientists, and on affirmative action in universities. All state Academies maintain an association with the American Association for the Advancement of Science. We are members of the Section on Agriculture, Food and Renewable Resources. We welcome the opportunity for any AAS member to attend the AAAS meeting on our behalf. Information about the AAAS can be obtained at www.aaasmeeting.org.

12. **Section Officers** – written reports were submitted from Sections I (Biological Sciences), V (Physics and Mathematics), VIII (Behavioral and Social Sciences), IX (Health Sciences), and XII (Bioethics & History and Philosophy of Science):

    - Section I (**Biological Sciences**, Mark Meade) – I have, again, contacted several Biology Depts. throughout the state to encourage participation in the Academy and the annual meetings. I particularly focused on contacting smaller universities and community colleges to encourage their participation. Several community colleges (GSCC, Snead State) indicated that they will have students participating in future meetings.
    - Section V (**Physics and Mathematics**, John Tarvin) – I am currently "filling in" for Dr. Henry Glotfelty, who is on sabbatical this spring. The leadership for the coming year will be determined at the sectional Business Meeting following Thursday's (3/18/04) presentations. The Physics and Mathematics participation at the AAS Spring Meeting is similar to last year, with a total of five (5) papers; there were no poster submissions this year. There are a total of four (4) schools represented in these presentations. As always, there is a need for increased student participation. AAS provides an excellent opportunity for student presenters, in that the sessions are small and "non-hostile" for a new presenter. I encourage all members to consider having their students present their research efforts – especially senior research projects – at the meeting next year.
    - Section VIII (**Behavioral and Social Sciences**, Betsy Witt) – Section VIII will meet at the Annual Meeting on Thursday, March 18, at the University of Montevallo. We have a total of eighteen papers scheduled for presentation. There will be three student papers presented, two of which will be judged for the student paper competition. William Osterhoff, Richard Hudiburg, and Gerald Fisher will be the judges for the competition. One poster will be presented at the meeting.
    - Section IX (**Health Sciences**, Peggy Hays) – Twenty-three papers are to be presented at the 81st Annual Meeting of the AAS at the University of Montevallo. Eight posters are listed for presentation. Our section presents on Thursday, the 18th. Dr. Pieroni will be presiding officer for the morning and Dr. Ruth Washington will preside at the afternoon session
    - Section XII (**Bioethics & History and Philosophy of Science**, Jim Bradley) – At the spring Executive Committee meeting of the Academy, 2003, I proposed adding this section to the Academy and volunteered to be its first chairperson. After some discussion, the Committee agreed that this was a good idea if enough people would support it by contributing papers. The president asked that I determine interest in the new section and that if 10-15 persons showed interest, that I should report this at the fall Ex-

ecutive Committee meeting and receive its approval for extablishing this section in time for the spring meeting, 2004. I am happy to report that 26 persons at AU, UAB and Tuskegee University have expressed interest in this section. I therefore request that the Executive Committee approve the new section and that its debut be at the march, 2004 meeting of the Academy.

13. Larry Krannich (**Executive Director**) submitted a report on his activities since the first of the year. Since the last Executive Committee Meeting, my activities have focused on the following:

    1. Letters were sent to solicit support for the Journal from Alabama colleges and universities with $3;950 received in checks, to date.
    2. A list was developed of URL's for Alabama colleges and universities to aid Section Chairs in developing e-mail contact lists for the Academy sections and solicit new members. The list is included at the end of this report.
    3. Because Section II did not have a Chair or Vice-Chair, e-mail communications were sent to chemistry faculty at all Alabama colleges and universities to solicit their participation in Section II and VII programs and to update their membership.
    4. January and February were spent coordinating with section chairs, symposium chair, junior academy, science fair coordinator, science Olympiad coordinator, and general program chair the development of the program and program booklet for the 81st Annual meeting of the Academy. The program booklet for the 81st annual meeting was constructed, sent to all section chairs to proof, posted on the web (February 16, 2004), and printing supervised to assure a March 10th delivery to the host institution.
    5. In late February, Anne Cusic and I with Drs. Neil Berte, Irwin Penfield, and Clyde Stanton from Birmingham Southern to secure Birmingham Southern College as the site for the 2005 annual meeting of the Academy. They have agreed to serve as the host institution for the meeting, which is tentatively set for March 16-19, 2005.
    6. Individuals at Troy State University and Tuskegee University were communicated with to receive their commitment to host annual meetings of the Academy in 2006 and 2007, respectively. They have tentatively agreed to serve as hosts. Samford University has volunteered to host the meeting in 2008.
    7. Steve Watts and I worked together to revise the Constitution and By-Laws to make it more reflective of Academy operations, use more contemporary designations, and update dues amounts. The revised version was distributed electronically to all Academy members to solicit their comments with notification that voting on the revision would occur at the business meeting of the Academy on Friday, March 19th.
    8. Discussions are ongoing with the Alabama Science Teacher Association to explore holding a joint annual meeting.

URL's of Alabama College and Universities

Alabama A&M Univ.	http://www.aamu.edu/
Alabama State Univ.	http://www.alasu.edu
Athens State Univ.	http://www.athens.edu/
Auburn Univ.	http://www.auburn.edu/
Auburn Univ. Montgomery	http://www.aum.edu
Birmingham Southern College	http://www.bsc.edu/

Columbus State Univ.	http://www.colstate.edu
Huntingdon College	http://www.huntingdon.edu/
Jacksonville State Univ.	http://www.jsu.edu/
Judson College	http://www.judson.edu/
Miles College	http://miles.edu
Oakwood College	http://www.oakwood.edu/
Samford Univ.	http://www.samford.edu/
Spring Hill College	http://www.shc.edu/
Stillman College	http://www.stillman.edu
Talladega College	http://www.talladega.edu
Troy State Univ.	http://www.troyst.edu
Troy State Univ. Dothan	http://www.tsud.edu/
Troy State Univ. Montgomery	http://www.tsum.edu/
Tuskegee University	http://www.tuskegee.edu
The University of Alabama	http://www.ua.edu/
University of Alabama at Birmingham	http://www.uab.edu
University of Alabama in Huntsville	http://www.uah.edu/
University of Mobile	http://www.umobile.edu
University of Montevallo	http://www.montevallo.edu/
University of North Alabama	http://www.una.edu/
University of South Alabama	http://www.southalabama.edu/
University of West Alabama	http://www.uwa.edu/

C. Committee Reports

1. Local Arrangements (Houston Byrd) – no report

2. Finance (Eugene Omasta) – see **B6** (Treasurer's Report)

3. Membership (Mark Meade) – no report

4. Research (Steve Watts) – This year 26 students applied for travel awards to the Montevallo meeting. All were presenting papers or posters. Awards were generally $35 depending on apparent need (distance to meeting). All were presenters. A total of $910 was awarded (Budgeted amount is $750). In addition, 10 students applied for research grants. The committee is evaluating the grants and most of these will be awarded partially or in full for a total of ca. $2,000 (budgeted amount is $2,400). Further discussion on the ability of students to ask for book purchases (assumed to be for their personal library) is warranted. An additional 26 students have applied for the Research Paper/Poster Competition in several sections. New (slightly modified) evaluation forms were sent to all section chairs.

All categories of awards and activities were handled electronically for the first time. Several minor modifications may be needed for next year, but in general electronic submissions GREATLY improved the process and eliminated a gruesome paper trail.

Suggested modifications for the Research Grant Applicants:

1. Only accept applications from those students whose mentors are members (in good standing) of the academy.
2. Provide financial officer information on the application.
3. Do not provide support for book purchases (OK for software)

5. **Long-Range Planning** (Ken Marion) – The Long-Range Planning Committee believes our major long-term concern is membership enrollment. Accordingly, we recommend that the Academy take steps to establish a committee (ad hoc, or steering committee, or chairs of sections) to formulate a structured plan for the recruitment/retention of members. The viability of the Academy ultimately rests on positive steps in this direction.

   Other items to examine in association with the annual meeting are to monitor the effectiveness of on-line registration and to consider potential changes in the timing and/or format of the banquet, in order to potentially improve attendance. There was some discussion of switching to a luncheon banquet.

6. **Auditing – Senior Academy** (David Schedler) – no written report

7. **Auditing – Junior Academy** (Govind Menon) – no written report

8. **Editorial Board and Associate Journal Editors** (Thane Wibbels) – no report

9. **Place and Date of Meeting** (Thomas Bilbo) – the meeting will be held at Birmingham-Southern College, March 16-19

10. **Newsletter** (open) – no report

11. **Public Relations** (Richard Buckner) – no report

12. **Archives** (Troy Best) – no report

13. **Science and Public Policy** (Dail Mullins) – The Science and Public Policy Committee has been relatively inactive since last spring. Only two items are perhaps worth mentioning:

    - I have informed Steve Watts, the immediate past-president of AAS, that I have in my office at UAB approximately 500-600 copies of the National Academy of Sciences 1998 publication, *Teaching about Evolution and the Nature of Science*, which I intend to leave with the Academy upon my retirement, July 1. These were originally intended for distribution to life science and earth science teachers in Alabama's public high schools, but the state of Alabama refused to pay postage for their mailing.

    - On March 10, 2004, the Alabama Senate Education Committee passed Senate Bill 336—the so-called "Academic Freedom Act"—which gives teachers and instructors at public educational institutions from kindergarten to university the "affirmative right

and freedom to present scientific, historical, theoretical, or evidentiary information pertaining to alternative theories or points of view on the subject of biological or physical origins." The bill is framed as an academic freedom issue, although it is clear that the current protections on speech and academic freedom already cover "origins" along with all other topics. The actual purpose of the bill seems to be allowing and encouraging the teaching of creationism in public schools. Senator Wendell Mitchell, the lead sponsor of SB336, is quoted in the February 18, 2004 issue of the *Montgomery Advertiser* as saying: "This bill will level the playing field because it allows a teacher to bring forward the biblical creation story of humankind." In cooperation with Nick Matzke of the National Center for Science Education and Robert Collins, a local activist, I distributed material about this matter—including the phone numbers and email addresses of Senators on the Alabama Senate Education Committee—to the AAS distribution list, seeking help from the membership to halt passage of this bill. That effort failed.

14. Gardner Award (Prakash Sharma) – no report

15. Carmichael Award (Velma Richardson) – The article selected for the Emmett B. Carmichael Award this year is: "Effect of 4-ethyl-4-aza-5α-cholestane (ND 497) on Carbohydrate Metabolism in *Staphylococcus aureus*," by Norman J. Doorenbos (Department of Pharmacal Sciences, Harrison School of Pharmacy, Auburn University), Samia A. El Dardiry (Tanta University, Tanta, Egypt) and Lyman A. Magee (Dept. of Biology, University of Mississippi). This article appears in the January 2003 issue of the Journal of the Alabama Academy of Science, 74(01):1-8. All manuscripts appearing in Volume 74 (1, 3/4) were included in the judging.

16. Resolutions (Priscilla Holland) – no report

17. Nominating Committee (Larry Davenport) – My main task was to serve as the Nominations Committee. The slate of officers for 2004-2005 is the following, with those serving new or renewed positions in boldface type:

President: Ron Jenkins (2005)
President-Elect: Larry Davenport (2005)
Second Vice-President: David Nelson (2005)
Secretary: Peggy Hays (2007)
Treasurer: Betsy Dobbins (2006)
Editor: Jim Bradley (2005)
State Counselor to the Junior Academy: B. J. Bateman (2005)
Associate Counselor to the Junior Academy: Henry Barwood (2007)
Associate Counselor to the Junior Academy: Wanda Phillips (2005)
Coordinator of State Science Fairs: Virginia Valardi (2006)
Coordinator of State Science Olympiad: Jane Nall (2007) – not yet confirmed
AAAS Representative: Steve Watts (2007)
Trustees: Wayne Finley (2005)
Ken Marion (2005)
Prakash Sharma (2005)
Walter Wilborn (2005)

B. J. Bateman (2006)
Dan Holliman (2006)
Joe Thomas (2006)
Ellen Buckner (2006)
Larry Boots (2007)
Gene Omasta (2007)
Adriane Ludwick (2007)
Mike Moeller (2007)

18. Mason Scholarship-(Michael Moeller) - We had two completed applications for the William H. Mason Fellowship this year. After considering the application material, the committee has selected Ms. Michele Bryant for the $1000 fellowship and she has been notified of this award. Ms. Miller received her B.S. with a major in biology and a minor in chemistry from the University of North Alabama. She is enrolling at the University of Alabama in Birmingham for her teacher certification program

The committee chairperson is very appreciative of the work by Dr. Malcolm Braid and Dr. Sandy Caudle for their work in reading and rating the applications.

19. Gorgas Scholarship Foundation (Ellen Buckner) – The Gorgas Scholarship Committee is pleased to report that the Alabama Science Talent Search continues to maintain a high quality of submissions from the State to the Intel National Science Talent Search. The competition is very close this year with students very prepared with top scores in science courses and grades.

I am delighted to report the addition of the University of South Alabama to the roser of Alabama Colleges and Universities which offer additional scholarships to Gorgas winners and finalists. This brings to 18 the number of institutions offering additional awards.

The finals of the Gorgas Competition will be held Friday, March 19, in room 211 of Harman Hall, University of Montevallo. Finalists were named from four high schools from across the state. The Committee would like to recognize the outstanding teacher-sponsors of these finalists. Their work in encouraging students to enter the competition is instrumental to both the success of the program and to the success of the students. These are as follows:

Brooks High School – **Vicki Farina**
Henry A. Bradshaw High School – **Lori Chittam**
Jefferson County IBS – **Debbie Anderson**
Virgil I. Grissom High School – **Lady Emrich & Deborah Ormond**

I would like to thank Sally Clark for her excellent assistance in preparations for the Gorgas competition and recruitment of judges from the University of Montevallo. I would like to thank the many judges who read papers and will be assisting in the final judging on Friday. Please attend the open viewing of Gorgas exhibits from 3:00 to 5:00pm in Room 211 of Harman Hall. The winners will be announced at the Joint Banquet.

20. Electronic Media (Richard Hudiburg) - I report the following activities:

1. Revised and updated on-line paper and poster title submission forms for each section of the Alabama Academy of Science for the 81st annual meeting. The forms are on the Academy website: http://www.alabamaacademyofscience.org . The web site has the on-line submission forms for the Committee on Research paper and poster competition and travel.

   Submission results for 2004 annual meeting (2003 within parenthesis):

   - There were 174 (150) paper and poster on-line submissions to various sections.
   - There were 33 (20) paper and poster competition on-line submissions.
   - There were 34 (39) travel request submissions.

2. Developed electronic submission procedure for student research grants in consultation with the chair of the Committee on Research.

3. Developed electronic submission procedure for submitting abstracts for annual meeting in consultation with the Editor of the *Journal of the Alabama Academy of Science.*

4. Updated information on the AAS website for officers and committees. Established links for 81st annual meeting information to the University of Montevallo meeting website.

5. Responded to various requests from the President of AAS, Executive Director of AAS and other members concerning changes to the AAS website.

6. Linked a downloadable PDF file or Word File of the 81st annual meeting program provided by the Executive Director of AAS. A link was placed on the AAS web page to a downloadable copy of membership form to the AAS.

D. Old Business – Dr. Sharma wants to form an AAS Fellows Committee, and to report back to the Executive Committee with criteria for selection at the Fall Executive Committee meeting.

E. New Business – none

F. Adjournment – the meeting was adjourned at 9:07pm

Respectively submitted,

Dail W. Mullins, Jr.
Secretary

INSTRUCTIONS TO AUTHORS

Editorial Policy: Publication of the *Journal of the Alabama Academy of Science* is restricted to members. Membership application forms can be obtained on the Academy's web site: www.alabamaacademyofscience.org. Subject matter should address original research in one of the discipline sections of the Academy: Biological Sciences; Chemistry; Geology: Forestry, Geography, Conservation, and Planning; Physics and Mathematics; Industry and Economics, Science Education; Social Sciences; Health Sciences; Engineering and Computer Science; and Anthropology. Timely review articles of exceptional quality and general readership interest will also be considered. Invited articles dealing with Science Activities in Alabama are occasionally published. Book reviews of Alabama authors are also solicited. Submission of an article for publication in the implies that it has not been published previously and that it not currently being considered for publication elsewhere. Each manuscript will receive at least two simultaneous peer reviews.

Submission: Submit an original and two copies to the editor. Papers which are unreasonably long and verbose, such as uncut theses, will be returned. The title page should contain the author's name, affiliation, and address, including zip code. The editor may request that manuscripts be submitted on a diskette upon their revision or acceptance.

Manuscripts: Consult recent issues of the *Journal* for format. Double-space manuscripts throughout, allowing 1-inch margins. Number all pages. An abstract not exceeding 200 words will be published if the author so desires. Use heading and subdivisions where necessary for clarity. Common headings are: **Introduction** (including literature review), **Procedures** (or **Materials and Methods**), **Results, Discussion**, and **Literature Cited**. Other formats may be more appropriate for certain subject matter areas. Headings should be in all caps and centered on the typed page; sub-headings should be italicized (underlined) and placed at the margin. Skip footnote number(s) if one or more authors must have their present address footnoted.

Illustrations: Submit original inked drawings (graphs and diagrams) or clear black and white glossy photographs. Width must not exceed 15 cm and height must not exceed 20 cm. Illustrations not conforming to these dimensions will be returned to the author. Use lettering that will still be legible after a 30% reduction. Designate all illustrations as figures, number consecutively, and cite all figures in the text. Type figure captions on a separate sheet of paper. Send two extra sets of illustrations; xeroxed photographs are satisfactory for review purposes.

Tables: Place each table on a separate sheet. Place a table title directly above each table. Number tables consecutively. Use symbols or letters, not numerals, for table footnotes. Cite all tables in the text.

Literature Cited: Only references cited in the text should be listed under **Literature Cited.** Do not group references according to source (books, periodicals, newspapers, etc.). List in alphabetical order of senior author names. Cite references in the text parenthetically by author-date.

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